DOCUMENT RESUME

ED 420 235 HE 031 285

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TITLE First-Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education. Statistical Analysis Report. Postsecondary Education Descriptive Analysis Reports.
INSTITUTION MPR Associates, Berkeley, CA.
SPONS AGENCY National Center for Education Statistics (ED), Washington, DC.
REPORT NO NCES-98-082
ISBN ISBN-0-16-049614-4
PUB DATE 1998-06-00
NOTE 95p.
PUB TYPE Numerical/Quantitative Data (110) -- Reports - Descriptive (141)
EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Academic Achievement; Academic Persistence; Enrollment Influences; Family Influence; Higher Education; Longitudinal Studies; Outcomes of Education; *Student Characteristics; Student Experience; *Undergraduate Students; Undergraduate Study
IDENTIFIERS Baccalaureate and Beyond Longitudinal Study (NCES); Beginning Postsecondary Students Long Study; *First Generation Students

ABSTRACT

This report uses data from the 1989-90 Beginning Postsecondary Students Longitudinal Study and the 1993 Baccalaureate and Beyond Longitudinal Study to examine the postsecondary experiences and outcomes of first-generation students relative to their peers. After an overview of the demographic, aspirational, and enrollment characteristics of first-generation and non-first-generation students, the report compares the persistence and attainment rates of these groups; it also examines the labor market and further postsecondary outcomes of these students. The major findings are: (1) first-generation students were more likely to be older, have lower incomes, be married, and have dependents than non-first-generation peers; (2) first-generation students were more likely than their peers to enroll in postsecondary education part-time, and to attend public two-year institutions, for-profit institutions, or other less-than-four-year institutions; (3) first-generation students were equally as likely to take remedial classes as peers, though there were differences by sector on this measure; (4) first-generation students were more likely than peers to say that being very well off financially was very important to them; (5) first-generation students persisted in postsecondary education and attained credentials at lower rates than peers; and (6) overall, first-generation status had a negative effect on persistence and attainment. A glossary and technical notes are appended. (DB)

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Statistical Analysis Report June 1998

Postsecondary Education Descriptive Analysis Reports

First-Generation Students:

Undergraduates Whose Parents Never Enrolled in Postsecondary Education

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First-Generation Students:

Undergraduates Whose Parents Never Enrolled in Postsecondary Education

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Suggested Citation

U.S. Department of Education. National Center for Education Statistics. *First-Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education*, NCES 98–082, by Anne-Marie Nuñez and Stephanie Cuccaro-Alamin. Project Officer: C. Dennis Carroll. Washington, DC: 1998.

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Highlights

This report uses data from the 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:90/94) and the 1993 Baccalaureate and Beyond Longitudinal Study (B&B:93/94) to examine the postsecondary experiences and outcomes of first-generation students relative to their peers. After an overview of the demographic, aspirational, and enrollment characteristics of first-generation and non-first-generation students, the report compares the persistence and attainment rates of each of these two groups. It then examines the labor market and further postsecondary outcomes of these students. The major findings are:[1]

- First-generation students were more likely to be older, have lower incomes, be married, and have dependents than their non-first-generation peers (figure 2).
- First-generation students were more likely to enroll in postsecondary education part-time, and to attend public 2-year institutions; private, for-profit institutions; and other less-than-4-year institutions than their non-first-generation counterparts (table 4, table 3, figure 3).
- First-generation students were equally as likely to be taking remedial classes as non-first-generation students when they began their postsecondary education. However, there were differences by sector on this measure. At private, not-for-profit 4-year institutions, first-generation students were more likely to be taking remedial courses than their counterparts whose parents had more than a high school education. At the same time, the proportions of first-generation and non-first-generation students at public 4-year and public 2-year institutions taking remedial coursework did not differ significantly (table 9).
- First-generation students were more likely than non-first-generation students to say that being very well off financially and providing their children with better opportunities than they had were very important to them personally (table 11).
- First-generation students were also more likely to say that obtaining the amount of financial aid they needed, being able to complete coursework more quickly, being able to live at home, and being able to work while attending the school were very important influences in their decision to attend their particular postsecondary institution (table 11).

[1] All findings reported in highlights were taken directly from the report, where all comparisons are tested for significance.

- First-generation students persisted in postsecondary education and attained credentials at lower rates than their non-first-generation counterparts. This finding held for students at 4-year institutions and public 2-year institutions (figure 5).
- If first-generation students attained bachelor's or associate's degrees, they earned comparable salaries and were employed in similar occupations as their non-first-generation peers (table 22, table 23).
- Even when controlling for many of the characteristics that distinguished them from their peers, such as socioeconomic status, institution type, and attendance status, first-generation student status still had a negative effect on persistence and attainment (table 25).

Foreword

This report examines the postsecondary experiences of first-generation college students, students whose parents never enrolled in postsecondary education, and compares them with those of their non-first-generation counterparts. The report begins by describing first-generation and non-first-generation students' demographic characteristics, what mattered to them, how they selected their institution, and the characteristics of their enrollment (i.e, degree program). It then goes on to examine their postsecondary persistence and attainment outcomes. The report concludes with an investigation of their labor market outcomes and access to further educational opportunities.

The report relies on data from the 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:90/94), the longitudinal component of the NPSAS:90 survey, a nationally representative sample that includes students enrolled in all types of postsecondary institutions, ranging from 4-year colleges and universities to less-than-2-year vocational institutions. The BPS:90/94 sample was limited to students who enrolled in postsecondary education for the first time during the 1989–90 academic year. The BPS cohort was subsequently followed up in 1992 and 1994, with the latter follow-up offering a wide range of information regarding student persistence and degree attainment 5 years after the beginning students initially enrolled in postsecondary education. For a more complete analysis of labor market and further educational outcomes among bachelor's degree recipients, the analysis of the BPS:90/94 data was supplemented by using data from the 1993 Baccalaureate and Beyond Longitudinal Study (B&B:93/94). B&B:93/94 is a nationally representative sample of students who completed their bachelor's degrees in the 1992–93 academic year. The first follow-up survey was conducted in 1994, one year after graduation.

The estimates (mostly percentages) presented in the report were produced using the BPS:90/94 and B&B:93/94 Data Analysis Systems (DAS). The DAS is a microcomputer application that allows users to specify and generate their own tables. The DAS produces design-adjusted standard errors necessary for testing the statistical significance of differences shown in the tables. For more information regarding the DAS, readers should consult appendix B of this report.

Acknowledgments

The authors wish to thank all those who contributed to the production of this report. At MPR Associates, Andrea Livingston, Karyn Madden, and Barbara Kridl edited the final report, and Mary Sukkestad, Don Eike, Helen Jang, and Francesca Tussing provided essential production assistance. Laura Horn reviewed the report and made helpful suggestions from the early planning stages through the final report.

We would also like to acknowledge the helpful guidance and criticism from C. Dennis Carroll at NCES and Ellen Bradburn at the Education Statistics Services Institute. Finally, we would like to thank the members of the adjudication panel: Kristin Perry, Frank Morgan, and Robert Burton at NCES, David Bergeron at OPE, and Melanie Esten at NAICU for their careful reading and thoughtful comments.

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Introduction

Over the past 25 years, the value of a college degree has increased substantially. For instance, in 1972, males aged 25 to 34 with a bachelor's or higher degree earned 19 percent more than their counterparts with only a high school diploma. By 1995, this figure had climbed to 52 percent.[2] As the earnings gap between those who hold a bachelor's degree and those who do not has widened, the number of students enrolling in postsecondary education has grown. Between 1972 and 1995, the percentage of 16- to-24-year-old high school graduates immediately entering college increased from 49 to 62 percent.[3]

Individuals enroll in postsecondary education for many reasons, including intellectual, economic, and social considerations; however, the degree to which these reasons affect the decision to enroll varies among students. For many individuals, there is no question about their enrollment; such students typically have parents who are college educated and who view postsecondary education simply as "the next logical, expected, and desired stage in the passage toward personal and occupational achievement."[4] For others, enrollment represents a deliberate attempt to improve their social, economic, and occupational standing. Many of these students are the first members of their families to enroll in any education beyond high school. For these "first-generation students," postsecondary education offers both opportunity and risk, since it represents a departure from family traditions.[5]

First-generation students often have family and background characteristics that are associated with risk for attrition. For example, they are more likely than their peers to be from low-income families, have lower achievement (as measured by the Collegiate Assessment of

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[2]U.S. Department of Education, National Center for Education Statistics. *The Condition of Education 1997* (Washington, DC: 1997), Indicator 33, pp. 120–121.

[3]U.S. Department of Education, National Center for Education Statistics. *The Condition of Education 1997* (Washington, DC: 1997), Indicator 8, pp. 62–63.

[4]P.T. Terenzini, et al., "The Transition to College: Diverse Students, Diverse Stories," *Research in Higher Education* 31(1) (1994): 57–73.

[5]The majority of the research literature defines "first-generation" students as students whose parents have no postsecondary education. In some cases, such as defining eligibility for the U.S. Department of Education's TRIO programs, "first-generation" students are defined as students whose parents have never earned a bachelor's degree but may have some postsecondary experience.

Academic Proficiency), and have lower overall degree aspirations. They are also more likely to be older and to have dependent children than their non-first-generation counterparts.[6]

First-generation students also enroll predominantly in the 2-year sector.[7] While enrollment in this sector may be less expensive, some community colleges may lack the resources necessary to provide the special support services that first-generation students might need. Once enrolled in postsecondary education, first-generation students tend to work more hours off campus than their non-first-generation counterparts, complete fewer total course hours during their first year, and receive less support from family and friends for their enrollment.[8] Finally, first-generation students are less likely to attain a postsecondary credential than their counterparts.

Some research has used the concept of "integration and cultural transformation" to help explain the difficulties first-generation students face.[9] Regardless of generational status, initial enrollment in postsecondary education is a time of great upheaval. Students must adapt academically and socially to their new institutional surroundings, and the extent to which they adapt can play a role in their postsecondary outcomes. Poor academic preparation, family responsibilities, and full-time work, for instance, can pose severe challenges to a student's ability to integrate into postsecondary institutional life. In addition to these social and academic adaptations, first-generation students face the additional task of cultural adaptation.[10] Specifically, there is a distinct element of "cultural mobility" associated with postsecondary enrollment, particularly if no other family member has had any postsecondary education.[11] While many students have no trouble making this transition, others may encounter conflict between the cultures of their families/friends and their new college culture. How first-generation students negotiate these conflicts may influence their ultimate success.

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[6]P.T. Terenzini, et al., "First-Generation College Students: Characteristics, Experiences, and Cognitive Development," *Research in Higher Education* 37 (1) (1996): 1–22.

[7]In a study of community college students, Willett found that 80 percent of sampled 2-year college students came from backgrounds where no family members had earned a college credential. See L.H. Willett, "Are Community College Students First-Generation College Students?" *Community College Review* 17 (2) (Fall 1989): 48–52. In an analysis of the Beginning Postsecondary Students Longitudinal Study (BPS:90/94), it was found that 55 percent of first-generation students attended public 2-year institutions in 1994. See The Institute for Higher Education Policy, *Policy Steps 4* (1) (Spring 1997): 1–10.

[8]P.T. Terenzini, et al., "First-Generation College Students," 1996.

[9]J.P. Bean and B.S. Metzner, "A Conceptual Model of Nontraditional Undergraduate Student Attrition," *Review of Educational Research* 55 (4) (1985): 485–540; and H.B. London, "Transformations: Cultural Challenges Faced by First-Generation Students," *New Directions for Community Colleges* 80 (Winter 1992): 5–11.

[10]H.B. London, "Breaking Away: A Study of First-Generation College Students and Their Families," *American Journal of Education* 97 (1) (1989): 144–170.

[11]H.B. London, "Breaking Away: A Study of First-Generation College Students and Their Families," 1989.

In order for postsecondary institutions to better understand the unique needs of first-generation students, more must be known about who they are and their particular enrollment experiences. The purpose of this report is to provide such information. The report begins by describing the background characteristics of first-generation students. Next, it looks at where first-generation students enroll and why they have chosen their particular institution, followed by an analysis of measures of academic and social integration within the institution. The third section of the report examines the postsecondary persistence and attainment outcomes of first-generation students relative to their peers, and the report concludes by describing their labor market outcomes. Finally, to measure the independent effect of first-generation status on persistence and attainment, a multivariate analysis was conducted to control for covariation.

Data

Data from the 1989–90 Beginning Postsecondary Longitudinal Study (BPS:90/94) were used to examine the participation of first-generation students in postsecondary education. BPS:90/94 is the longitudinal component of the NPSAS:90 survey, a nationally representative sample that includes students enrolled in all types of postsecondary institutions, ranging from 4-year colleges and universities to 2-year and less-than-2-year vocational institutions. The BPS:90/94 sample is composed of students who enrolled for the first time in postsecondary education during the 1989–90 academic year; the cohort was subsequently followed up in 1992 and 1994. BPS:90/94 offers a wide range of information regarding students' academic and social experiences while enrolled, as well as their persistence and degree attainment 5 years after their initial enrollment in postsecondary education.

BPS:90/94 was also used to examine the labor market experiences of first-generation students relative to those of their peers who obtained less than baccalaureate degrees (associate's degrees and vocational certificates). BPS:90/94 spans 5 years, which is too little time for an analysis of labor market outcomes among bachelor's degree recipients, given that a majority of them may have minimal post-degree labor market experience.[12] Therefore, this analysis was supplemented with data from the 1993 Baccalaureate and Beyond Longitudinal Study (B&B:93/94), a nationally representative sample of students who completed their bachelor's degrees in the 1992–93 academic year. The first follow-up survey was conducted in 1994, one year after graduation. B&B:93/94 provides information regarding students' immediate entry into the labor market, graduate education, or both (i.e., within 1 year after bachelor's degree attainment).

[12]An analysis of data from the Baccalaureate and Beyond Longitudinal Study (B&B:93/94) revealed that only 36 percent of 1992–93 bachelor's degree recipients had completed their degree within 4 years of beginning postsecondary education. A. McCormick and L. Horn, *A Descriptive Summary of 1992–93 Bachelor's Degree Recipients 1 Year Later, With an Essay on Time to Degree* (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 1996), 28.

Who Are First-Generation Students?

First-generation students are defined as those whose parents' highest level of education is a high school diploma or less. In cases where parents have different levels of education, the maximum education level of either parent determines how the student is categorized. In this analysis, these students are compared with two other groups: those whose parent(s) have attended some college, but have attained less than a bachelor's degree; and those whose parent(s) have attained a bachelor's or an advanced degree. Almost half (about 43 percent) of first-time beginning students in 1989–90 were identified as first-generation (figure 1). For students not classified as first-generation, 23 percent had parents with some college experience, and 34 percent had parents who had attained a bachelor's or higher degree (table 1).

First-generation students were less likely to be white, non-Hispanic, than their non-first-generation counterparts and more likely to be Hispanic (11 percent versus 5 percent) (figure 2). Compared with their counterparts, first-generation students were also more likely to be female (57 percent versus 51 percent) (table 2).

Table 1—Percentage distribution of 1989–90 beginning postsecondary students according to first-generation status, by type of institution

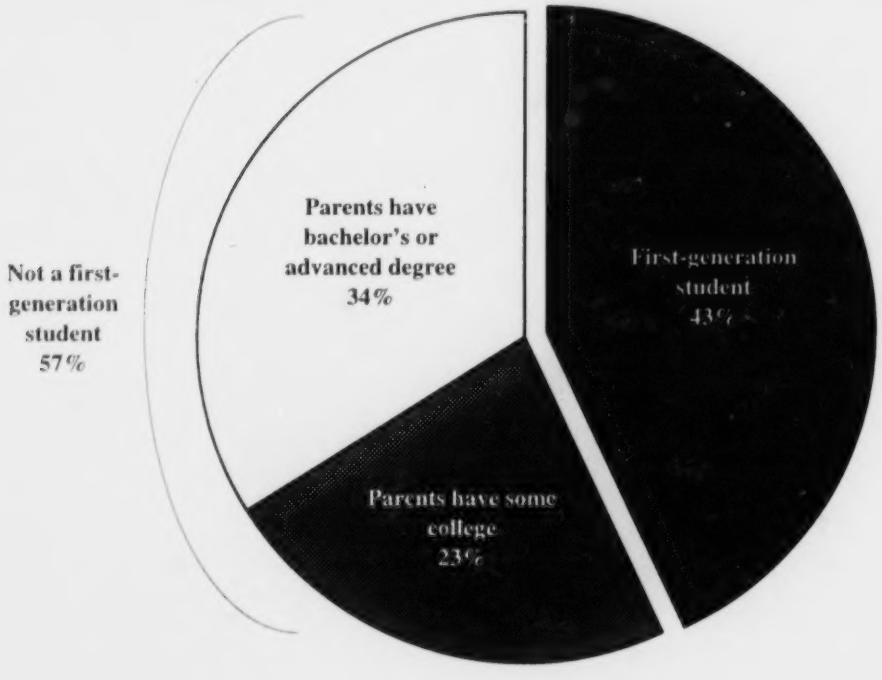
		Not a first-generation student		
	First-generation student	Parents have some college	Parents have bachelor's or advanced degree	Total
Total*	43.4	22.9	33.7	56.6
Institution type				
Public 4-year	29.5	26.8	43.7	70.5
Private, not-for-profit 4-year	25.0	21.6	53.4	75.0
Public 2-year	50.5	21.8	27.8	49.6
Private, for-profit	66.8	20.9	12.3	33.2

*Students in other less-than-4-year institutions (private, not-for-profit; public, less-than-2-year; and private, not-for-profit less-than-2-year) are included in the total, but not in the detail because the sample sizes were too small.

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Figure 1—Percentage distribution of 1989–90 beginning postsecondary students according to first-generation status

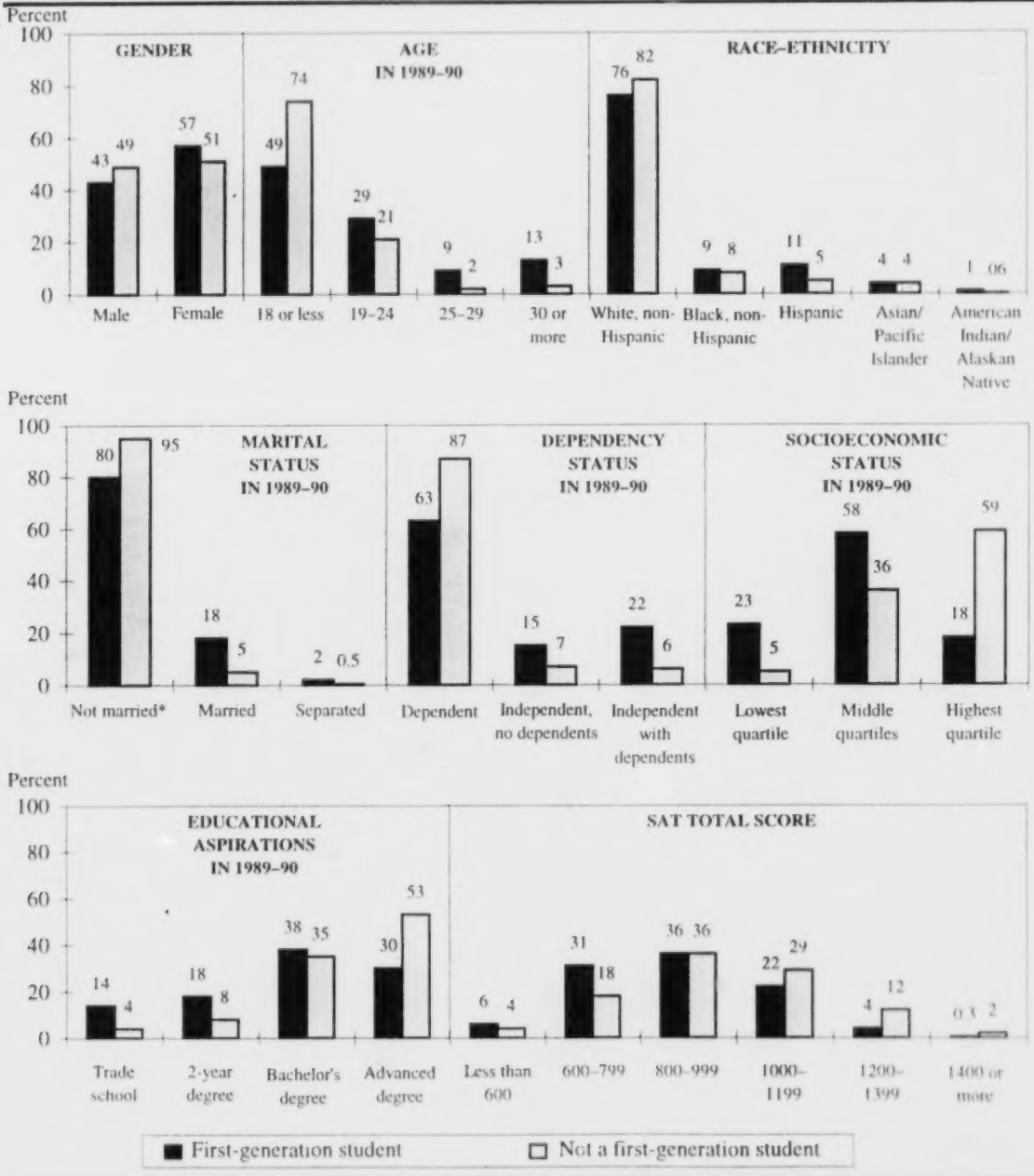

Not a first-generation student 57%
Parents have bachelor's or advanced degree 34%
First-generation student 43%
Parents have some college 23%

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

In addition, according to 1989–90 data, the families of first-generation students had lower family incomes than those of non-first-generation students. As an example, nearly one-quarter (23 percent) of first-generation students had family incomes in the lowest quartile, compared with 5 percent of students whose parents had attained higher educational levels.[13] Meanwhile, 59 percent of non-first-generation students had family incomes in the highest quartile, compared with 18 percent of their counterparts (table 2).

[13]These income quartiles were based on quartiles defined in the NPSAS:90 data, which included not only beginning postsecondary students, but all first-year students. Since students in the BPS: 89/90 sample were more likely to be traditional, dependent, and have higher incomes than other first-year students, they were more likely to have family SES in the highest quartile.

Figure 2—Percentage distribution of 1989–90 beginning postsecondary students according to demographics, by first-generation status



*The category "not married" includes the following categories: single, never married; living as married, never married; divorced; widowed; and living as married, previously divorced.

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Table 2—Percentage distribution (by columns) of 1989–90 beginning postsecondary students according to demographics, by first-generation status

			Not a first-generation student		
	Total	First-generation student	Total	Parents have some college	Parents have bachelor's or advanced degree
Total	100.0	100.0	100.0	100.0	100.0
Gender					
Male	46.0	42.7	49.3	45.6	51.9
Female	54.0	57.3	50.7	54.4	48.2
Age in 1989–90					
18 years or younger	61.2	49.4	74.2	66.7	79.2
19–24 years	24.3	29.2	21.3	25.9	18.2
25–29 years	5.0	8.8	2.1	3.1	1.3
30 years or older	9.5	12.6	2.5	4.4	1.3
Race–ethnicity					
White, non-Hispanic	78.8	75.9	81.8	79.9	83.1
Black, non-Hispanic	8.8	9.2	8.1	10.7	6.3
Hispanic	7.6	10.5	5.2	6.4	4.4
Asian/Pacific Islander	4.0	3.6	4.3	2.9	5.3
American Indian/Alaskan Native	0.7	1.0	0.6	0.2	0.8
Marital status in 1989–90					
Not married[1]	86.7	80.2	94.6	91.5	96.6
Married	12.2	18.0	5.0	7.5	3.2
Separated	1.2	1.7	0.5	1.0	0.1
Dependency status in 1989–90					
Dependent	74.0	63.0	86.7	80.2	91.1
Independent, no dependents	10.9	14.9	7.0	10.9	4.3
Independent with dependents	15.1	22.1	6.3	9.0	4.5
Socioeconomic status in 1989–90[2]					
Lowest quartile	14.7	23.3	4.6	8.2	2.2
Middle quartiles	45.7	58.4	36.1	53.6	24.2
Highest quartile	39.7	18.3	59.3	38.2	73.7
Educational aspirations in 1989–90					
Trade school	9.1	14.2	4.4	8.0	1.9
2-year degree	12.8	18.4	8.0	10.6	6.2
Bachelor's degree	35.9	37.7	34.8	37.2	33.2
Advanced degree	42.1	29.6	52.9	44.2	58.7

Table 2—Percentage distribution (by columns) of 1989–90 beginning postsecondary students according to demographics, by first-generation status—Continued

			Not a first-generation student		
	Total	First-generation student	Total	Parents have some college	Parents have bachelor's or advanced degree
SAT total score					
Less than 600	4.6	6.1	3.9	4.3	3.8
600–799	21.9	31.2	18.2	24.1	15.6
800–999	35.6	36.3	35.5	36.7	35.0
1000–1199	26.9	22.4	28.8	27.8	29.2
1200–1399	9.6	3.6	11.8	6.1	14.3
1400 or more	1.4	0.3	1.8	1.0	2.1

[1]The category "not married" includes the following categories: single, never married; living as married, never married; divorced; widowed; and living as married, previously divorced.

[2]These income quartiles were based on quartiles defined in the NPSAS:90 data, which included not only beginning postsecondary students, but all first-year students. Since students in the BPS:89/90 sample were more likely to be traditional, dependent, and have higher incomes than other first-year students, they were more likely to have family SES in the highest quartile.

NOTE: Unlike the other tables in this report, the distributions are by columns instead of rows. Details may not sum to totals due to rounding.

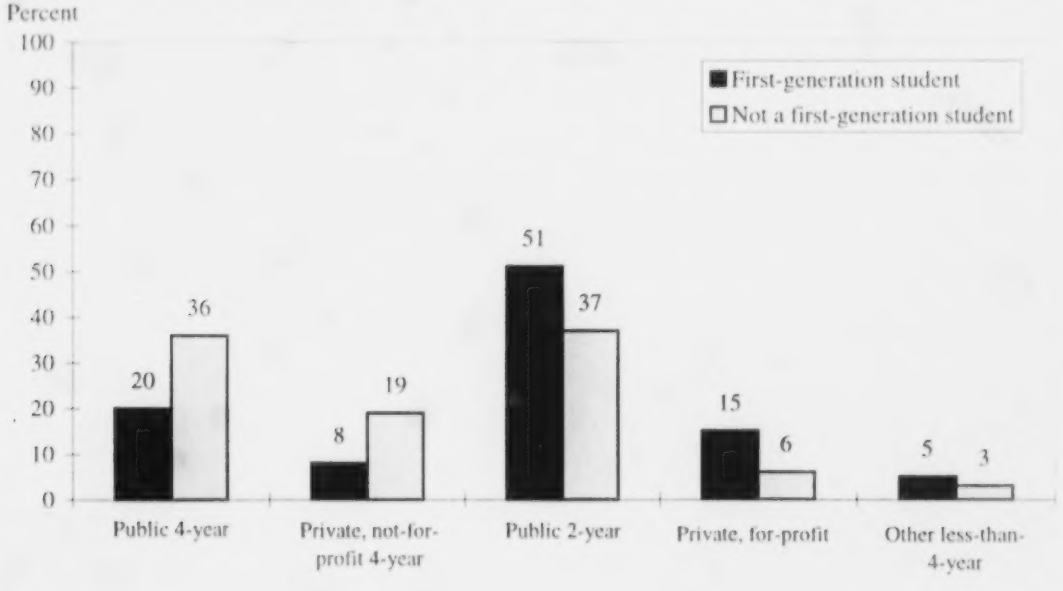
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

In general, when surveyed in the 1989–90 school year, first-generation students were more likely to be older, to be married, and to have dependents than students whose parents had attained higher levels of education. For example, first-generation students were more likely to be 30 years or older (13 percent versus 3 percent), and less likely to be 18 and under (49 percent) than non-first-generation students (74 percent) (table 2). Consistent with their age differences, first-generation students were more likely than non-first-generation students to be financially independent (both with and without dependents), and more likely to be married (table 2).

Enrollment Characteristics

The results from this study show that first-generation students were more likely than other students to attend public 2-year institutions (51 percent versus 37 percent); private, for-profit institutions (15 percent versus 6 percent); and other less-than-4-year institutions (5 percent versus 3 percent) (figure 3).[14] Students whose parents had any college education, on the other hand, were more likely to attend either public 4-year (36 percent versus 20 percent) or private, not-for-profit 4-year institutions (19 percent versus 8 percent) (table 3).

Figure 3—Percentage of 1989–90 beginning postsecondary students according to type of first institution, by first-generation status



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

[14]Other less-than-4-year institutions include public less-than-2-year institutions (2 percent); private, not-for-profit less-than 2-year institutions (0.3 percent); and private, not-for-profit 2-year institutions (2 percent). Despite the different functions of these institutions, there are too few cases in each specific type of institution for reliable analyses.

Table 3—Percentage distribution of 1989–90 beginning postsecondary students according to type of first institution, by first-generation status

	Public 4-year	Private, not-for-profit 4-year	Public 2-year	Private, for-profit	Other less-than-4-year
Total	28.5	13.7	43.7	10.2	3.9
First-generation student	20.4	8.4	51.2	15.0	5.0
Not a first-generation student	35.9	18.5	37.0	5.5	3.1
Parents have some college	33.9	13.2	40.4	8.6	4.0
Parents have bachelor's or advanced degree	37.2	22.1	34.8	3.4	2.6

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

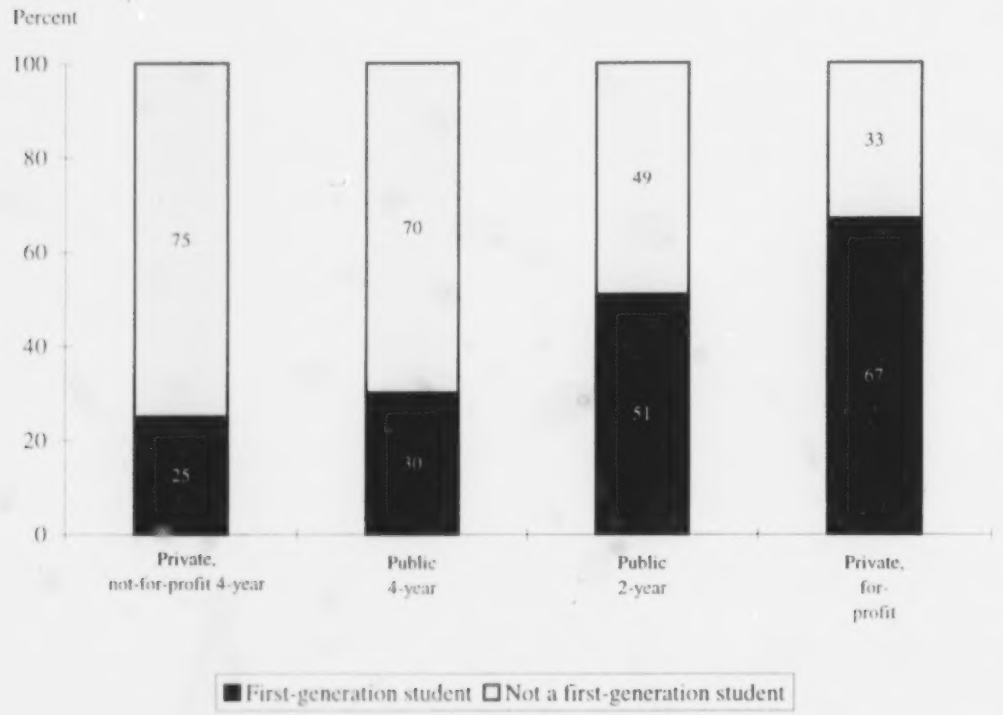
Among all students whose parents had attended at least some college, there were no differences in the likelihood of attending a public 4-year institution between students whose parents had attended some college but had not completed a degree and those whose parents had earned a bachelor's or an advanced degree (34 percent and 37 percent, respectively). However, students whose parent(s) had attained a bachelor's degree were more likely than those whose parents had only some college to attend a private, not-for-profit 4-year institution (22 percent versus 13 percent) (table 3).

First-generation students composed more of the student body at public 2-year institutions than either public 4-year or private not-for-profit 4-year institutions (51 percent versus 30 percent and 25 percent). Even higher proportions of first-generation students enrolled in private, for-profit institutions than at public 2-year institutions, as well as both kinds of 4-year institutions (figure 4).

Consistent with their concentration at public 2-year institutions, first-generation students were much more likely than those whose parents had obtained more education (30 percent versus 13 percent) to attend part time during their first year in postsecondary education. Generally, as the level of parents' education increased, the likelihood of part-time attendance decreased (table 4).

An examination of students' living arrangements reveals that first-generation students were less likely to live on campus (16 percent versus 40 percent), and more likely to live off campus

Figure 4—Percentage of 1989–90 beginning postsecondary students according to first-generation status, by first type of institution*



*Students in other less-than-4-year institutions (private, not-for-profit 2- to 3-year; public, less-than-2-year; and private, not-for-profit less-than-2-year) are not included in the detail, because the sample sizes were too small.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

(39 percent versus 19 percent), than their counterparts whose parents had more than a high school education. As the level of parental education increased from a high school degree or less (16 percent), to some college (32 percent), to a bachelor's or advanced degree (45 percent), so did the likelihood of living on campus (table 5). Among students whose parents did not have bachelor's degrees, those whose parents had attended some college but had attained less than a bachelor's degree were no more likely than first-generation students to live with their parents (47 percent versus 45 percent, respectively) (table 5).

Table 4—Percentage of 1989–90 beginning postsecondary students according to attendance status in 1989–90, by first-generation status

	Part-time	More than part-time
Total	21.7	78.3
First-generation student	30.1	69.9
Not a first-generation student	13.3	86.7
Parents have some college	17.3	82.7
Parents have bachelor's or advanced degree	10.5	89.5

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Table 5—Percentage distribution of 1989–90 beginning postsecondary students according to local residence in 1989–90, by first-generation status

	On campus	Off campus	With parents or relatives
Total	28.3	30.1	41.6
First-generation student	16.3	38.9	44.8
Not a first-generation student	39.7	19.1	41.2
Parents have some college	31.6	21.4	47.1
Parents have bachelor's or advanced degree	45.3	17.6	37.2

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

First-generation students, overall, were enrolled in different types of degree programs than non-first-generation students. Reflecting their greater likelihood of enrolling in less-than-4-year institutions, first-generation students were more likely than other students to be in certificate (22 percent versus 12 percent) or associate's degree programs (39 percent versus 30 percent), and less likely to be in a bachelor's degree program (23 percent versus 43 percent) (table 6). The likelihood of being in a certificate program declined as parental education levels increased from high school degree or less (22 percent), to some college (15 percent), to a bachelor's or advanced degree (10 percent). At the same time, the likelihood of being enrolled in a bachelor's degree program increased as the level of parental education increased (23 percent, to 37 percent, to 47 percent) (table 6).

Table 6—Percentage distribution of 1989–90 beginning postsecondary students according to type of degree program in 1989–90, by first-generation status

	Associate's degree	Bachelor's degree	Certificate	Other
Total	33.8	33.0	17.0	16.3
First-generation student	38.7	22.5	22.4	16.4
Not a first-generation student	29.8	43.2	12.1	14.9
Parents have some college	32.8	37.3	15.3	14.7
Parents have bachelor's or advanced degree	27.8	47.3	9.9	15.1

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

With respect to when students first enrolled in postsecondary education, first-generation students were more likely to delay their entry (46 percent versus 19 percent) than their counterparts whose parents had more than a high school education (table 7).

Table 7—Percentage distribution of 1989–90 beginning postsecondary students according to delayed entry status in 1989–90, by first-generation status

		Delayed	
	Did not delay	High school diploma	No high school diploma
Total	67.0	26.5	6.4
First-generation student	54.3	37.1	8.6
Not a first-generation student	80.9	15.7	3.4
Parents have some college	75.8	20.0	4.3
Parents have bachelor's or advanced degree	84.4	12.8	2.8

NOTE: Details may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

First-generation studerts also differed from their non-first-generation counterparts in how they financed their education. In particular, they were more likely to receive financial aid, in general (51 percent versus 42 percent), and grants (42 percent versus 35 percent) and loans (22 percent versus 18 percent), in particular, than their non-first-generation counterparts (table 8). At the same time, students whose parents had a bachelor's degree or higher were less likely than those

Table 8—Percentage of 1989–90 beginning postsecondary students receiving various types of financial aid in 1989–90, by first-generation status

	Any aid	Grants	Loans	Other
Total	45.7	38.1	19.6	11.6
First-generation student	50.5	42.4	22.4	10.4
Not a first-generation student	42.3	35.0	17.8	12.7
Parents have some college	47.2	40.0	21.3	13.9
Parents have bachelor's or advanced degree	39.0	31.7	15.4	11.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

whose parents had some college but less than a bachelor's degree to receive any financial aid (39 percent versus 47 percent). With respect to specific kinds of aid, students whose parents had earned at least a bachelor's degree were also less likely than their counterparts whose parents had some postsecondary experience but less than a bachelor's degree to receive either grants (32 percent versus 40 percent) or loans (15 percent versus 21 percent) (table 8).

Previous research has indicated that first-generation students are often less academically prepared than non-first-generation students. Across all sectors, first-generation students did not differ from their counterparts in terms of the number of remedial courses they were taking (15 percent and 16 percent, respectively) (table 9). Yet this study revealed differences within different sectors of postsecondary education among first-generation and non-first-generation students on the need for remedial education in order to obtain adequate preparation for college-level work. At public 4-year institutions, there was not a significant difference between the proportions of first-generation and non-first-generation students who were taking remedial courses (table 9). At private, not-for-profit 4-year institutions, however, first-generation students were more likely to be taking remedial courses. While there appear to be significant differences in the proportions of first-generation and non-first-generation students at public 2-year institutions enrolled in remedial coursework, there was not enough statistical evidence to conclude that they were different.

First-generation college students were also more likely to be working full time while enrolled in school. Compared with their counterparts, more first-generation students reported working full time while enrolled during their first year in postsecondary education (33 percent versus 24 percent) (table 10).

Table 9—Percentage distribution of 1989–90 beginning postsecondary students according to number of types of remedial education courses taken in 1989–90, by first-generation status and institution type

	None	One or more
Total	84.7	15.3
First-generation student	85.0	15.0
Not a first-generation student	84.1	15.9
Parents have some college	81.9	18.1
Parents have bachelor's or advanced degree	85.6	14.4
Public 4-year		
Total	83.9	16.1
First-generation student	81.8	18.2
Not a first-generation student	85.0	15.0
Parents have some college	80.9	19.1
Parents have bachelor's or advanced degree	87.5	12.6
Private, not-for-profit 4-year		
Total	89.6	10.4
First-generation student	86.2	13.8
Not a first-generation student	90.8	9.3
Parents have some college	86.4	13.6
Parents have bachelor's or advanced degree	92.5	7.5
Public 2-year		
Total	81.5	18.5
First-generation student	84.0	16.0
Not a first-generation student	78.3	21.7
Parents have some college	76.6	23.4
Parents have bachelor's or advanced degree	79.7	20.3

NOTE: Academic integration index is a composite based on how often student reported attending career-related lectures, participating in study groups with other students, talking about academic matter with faculty, or meeting with an advisor concerning academic plans. Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Table 10—Percentage of 1989–90 beginning postsecondary students according to whether worked full time while enrolled in 1989–90, by first-generation status

	Did not work full time while enrolled	Worked full time while enrolled
Total	71.7	28.3
First-generation student	66.8	33.2
Not a first-generation student	76.4	23.6
Parents have some college	76.1	23.9
Parents have bachelor's or advanced degree	76.6	23.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

What Mattered to First-Generation Students

The following section examines the relative importance of various matters to first-generation and non-first-generation students. These measures fall into two general categories: those associated with professional/financial achievement and those associated with personal aspirations. Professional/financial achievement matters include being able to find steady work, being successful in one's line of work, becoming successful in one's own business, becoming an authority in a given field, being very well off financially, being a leader in the community, or influencing the political structure. Personal matters include getting away from a particular area of the country, living close to parents and relatives, having children, giving their own children better opportunities, and having leisure time to enjoy personal interests. Examining differences in how important these various factors are to first-generation and non-first-generation college students can shed light on how they might differ in their motivations for enrolling in postsecondary education.

For each measure, students were asked whether the factor was "very important," "somewhat important," or "not important" to them. Compared with other students, first-generation students more often reported that factors related to financial security were very important to them personally. In addition, they were more likely than students whose parents had more than a high school education to say that "being very well off financially" was very important to them (61 percent versus 49 percent) (table 11). As a group, first-generation students and students whose parents had some postsecondary experience but less than a bachelor's degree were more likely than students whose parents had attained a bachelor's degree or higher education level to say that "being very well off financially" was very important to them (57 percent versus 47 percent). While first-generation students were not more likely than students whose parents had some college (85 versus 86 percent) to report that "being able to find steady work" was very important to them, both groups were more likely to report this as a very important matter than students whose parents had a college degree (81 percent).

By contrast, first-generation students were less likely than their counterparts to emphasize measures related to having political power as matters of importance. In particular, they were somewhat less likely than students whose parents had more than a high school education to report "influencing the political structure" (15 percent versus 18 percent) or to report "being a

Table 11—Percentage of 1989–90 beginning postsecondary students who find various professional/financial achievement matters important, by first-generation status

	Influence the political structure	Become successful in one's own business	Be successful in line of work	Be able to find steady work	Be well off financially	Become an authority in a given field	Be a leader in one's community
Total	17.0	42.7	91.2	83.9	54.1	58.8	22.7
First-generation student	15.3	44.6	92.5	85.2	61.4	58.9	20.4
Not a first-generation student	18.4	41.5	90.8	83.0	48.7	58.8	24.3
Parents have some college	17.9	43.0	90.8	86.3	51.0	60.4	23.4
Parents have bachelor's or advanced degree	18.8	40.5	90.8	80.8	47.1	57.7	25.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

leader in [their] community" (20 percent versus 24 percent) as very important to them (table 11). While these last two differences were statistically significant, they are relatively small in terms of practical significance.

According to first-generation student status, there were also several differences in the personal matters that students cited as very important (table 12). For example, first-generation

Table 12—Percentage of 1989–90 beginning postsecondary students who find various personal achievement-related matters important, by first-generation status

	Get away from this area of the country	Give own children a better opportunity	Have children	Have leisure time to enjoy interests	Live close to parents and relatives
Total	11.6	80.9	52.3	66.6	17.0
First-generation student*	12.3	85.3	52.2	66.3	20.7
Not a first-generation student*	10.8	77.4	52.1	67.6	14.2
Parents have some college	11.7	81.7	51.2	66.4	16.5
Parents have bachelor's or advanced degree	10.2	74.4	52.7	68.5	12.6

*In this table, a total of 52.3 percent of beginning postsecondary students indicate that to have children is very important to them. This total does not lie within the range of the subtotals for first-generation (52.2) and non-first-generation (52.1) students. In cases like this, values for totals may not be within range of subgroup values due to missing cases on the subgroup variables.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

students were more likely than other students to cite "[giving their own] children better opportunities than [they've] had" (85 percent versus 77 percent) as very important to them than non-first-generation students. Students whose parents had some college were no less likely than first-generation students (82 and 85 percent, respectively) to report this as a very important goal, but both groups were more likely than the group of students whose parents had a bachelor's or advanced degree to report this as an important matter (74 percent) (table 12). In addition, first-generation students were also more likely than non-first-generation students to report "living close to parents and relatives" (21 percent versus 14 percent) as a key matter of personal importance (table 12).

Why First-Generation Students Chose Their Institutions

Students were also asked whether specific cost-related, location-related, and reputation/other-related reasons were very important, somewhat important, or not very important to them in their decision to attend a particular institution. As with the professional and personal measures, for each reason, students were considered to have a positive response if they cited the specific reason as very important. Cost-related reasons include obtained financial aid needed; other living costs were less; tuition and other expenses were less; and could finish in a shorter length of time. Location-related reasons include could go to school and work; could live at home; school was close to home; and school was far away from home. Finally, reputation/other-related reasons include that the school had a good reputation, in general; that it had a good reputation for placing graduates; that the student had a better chance to get a job at school; and that the school offered courses that students wanted.

Cost-Related Factors

Certain cost-related factors were more important to first-generation students than non-first-generation students in selecting an institution. Consistent with their lower incomes, first-generation students were more likely than others to report that "[obtaining] the financial aid [they] needed at the school" was a very important reason for choosing their first institution (36 percent versus 25 percent) (table 13). First-generation students were also more likely to report choosing their institution because they could "finish the course in a short period of time" as a very important reason (35 percent versus 21 percent) (table 13). As parental education levels increased, the likelihood of students reporting financial aid (36 versus 29 and 22 percent) or finishing in a shorter time as a very important reason for attending an institution decreased as parental education increased (35 percent versus 25 percent and 19 percent) (table 13).

Location-Related Factors

First-generation students differed from their non-first-generation counterparts in terms of the specific location-related reasons they cited as important in choosing their institutions. For example, first-generation students were more likely than their counterparts to cite being able to

Table 13—Percentage of 1989–90 beginning postsecondary students with various cost-related reasons for choosing the institution in 1989–90, by first-generation status

	Obtained financial aid needed	Other living costs were less	Shorter time to finish	Tuition and other expenses were less
Total	30.0	24.5	27.8	36.5
First-generation student	36.0	25.5	34.9	37.9
Not a first-generation student	24.9	24.3	21.2	35.6
Parents have some college	29.2	26.4	24.6	38.3
Parents have bachelor's or advanced degree	21.9	23.0	18.9	33.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

"live at home" (56 percent versus 35 percent) and being able to "work while attending the school" (53 percent versus 36 percent) as very important reasons for selecting their institutions. For both reasons, as the parents' level of education increased, the likelihood that students cited these reasons as important decreased (table 14). First-generation students were also more likely to report choosing their institution because "the school was close to [their] home" (45 percent) than were non-first-generation students (35 percent). Yet they did not differ from the group of students whose parents had some college but had not attained a bachelor's degree in indicating this reason as important in their decision. Both first-generation students (45 percent) and students

Table 14—Percentage of 1989–90 beginning postsecondary students with various location-related reasons for choosing the institution in 1989–90, by first-generation status

	School is close to home	School is far away from home	Could live at home	Could go to school and work
Total	40.2	7.8	45.3	44.4
First-generation student	44.7	9.6	55.5	53.3
Not a first-generation student	34.6	6.4	34.7	36.1
Parents have some college	41.3	7.7	42.4	44.6
Parents have bachelor's or advanced degree	30.0	5.6	29.5	30.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

whose parents had some college experience but no bachelor's degree (41 percent) were more likely than students whose parents had earned a bachelor's degree or higher (30 percent) to indicate that the school being close to home was a very important reason for attending.

Reputation-Related Factors

Certain reputation-related factors mattered more to first-generation students than to other students in their selection of an institution. For instance, first-generation students were more likely than others to report choosing their institution because they "had a better chance to get a job at the school" (21 percent versus 13 percent) (table 15). First-generation students were also more likely than other students to report choosing their institution because it "offered the course of study [they] wanted" (72 percent versus 65 percent). They differed significantly from students whose parents had a bachelor's degree or higher but not from those whose parents had had some college but less than bachelor's degree in their likelihood of citing this as a very important reason for selecting their particular institution (72 percent versus 63 percent and 67 percent) (table 15).

Table 15—Percentage of 1989–90 beginning postsecondary students with various reputation-related and other reasons for choosing the institution in 1989–90, by first-generation status

	Good reputation for placing graduates	Offered courses that student wanted	School has a good reputation	Better chance to get a job at school
Total	40.7	67.8	50.8	16.5
First-generation student*	41.6	71.6	51.6	20.8
Not a first-generation student*	40.8	64.8	50.2	13.2
Parents have some college	42.4	67.1	49.8	14.8
Parents have bachelor's or advanced degree	39.6	63.1	50.5	12.1

*Value for total may not be within range of subgroup values due to missing cases on the subgroup variable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Academic and Social Integration

This study included an analysis of students' academic and social integration during the 1989–90 academic year relative to their generation status; these measures represent students' involvement in and adaptation to the institution. Each index is an average of students' responses to questions regarding the frequency of their participation in various academic and social activities during their first year in postsecondary education. Academic integration is a composite based on student responses regarding how often they attended career-related lectures, met with their advisor concerning academic plans, talked about academic matters with faculty, or participated in study groups with other students. Social integration is a composite based on student responses regarding how often they went places with friends from school, participated in school clubs, had contact with faculty outside of class, or participated in student assistance centers/programs.[15] The behaviors used to measure academic and social integration may influence the persistence of younger students differently from that of older students, who are more likely to be first-generation.[16] In the next two sections, the analyses of academic and social integration are presented both overall and according to the type of institution the students attended.

Academic Integration

First-generation students, overall, showed lower levels of academic integration than other students. They were less likely than students whose parents had at least some postsecondary experience to have high levels of academic integration (23 percent versus 33 percent), and more likely to report low levels of integration (30 percent versus 19 percent, respectively) (table 16).

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[15]Refer to appendix A for a more detailed description of how the academic integration and social integration variables were derived.

[16]Refer to figure 2 or table 2 of this report for information about the relationship between age and first-generation status. Limited research has been conducted that compares how academic and social integration measures affect the postsecondary experiences of younger, more traditional, and older, more nontraditional, students. This study revealed an association between age and low academic integration levels; students who were 18 years old or less were less likely than members of the other age groups to have low academic integration levels (BPS:90/94 DAS). Tinto, who initially developed the concepts of academic and social integration, acknowledges that measures of integration have largely been based on research about younger students enrolled in 4-year institutions and implies that integration measures may vary in importance for older, nontraditional students in a wider range of institution types. V. Tinto, *Leaving College: Rethinking the Causes and Cures of Student Attrition* (Chicago: The University of Chicago Press, 1993), 135. According to one study that explored the differential impact of a model of academic and social integration on the persistence of younger and older students, integration was more important to the persistence of younger students than it was for the older cohort. J. Grosset, "Patterns of Integration, Commitment, and Student Characteristics and Retention among Younger and Older Students," *Research in Higher Education* 32 (2) (1991): 159–178.

Table 16—Percentage distribution of 1989–90 beginning postsecondary students according to academic integration levels in 1989–90, by first-generation status and institution type

	Integration index		
	Low score	Moderate score	High score
Total	24.9	46.5	28.6
First-generation student[1]	30.4	46.8	22.8
Not a first-generation student[1]	19.1	47.6	33.3
Parents have some college	22.8	43.4	33.8
Parents have bachelor's or advanced degree	16.6	50.5	33.0
Public 4-year			
Total	15.1	51.0	33.9
First-generation student	15.5	52.7	31.9
Not a first-generation student	14.6	50.8	34.7
Parents have some college	17.6	48.3	34.1
Parents have bachelor's or advanced degree	12.7	52.3	35.0
Private, not-for-profit 4-year			
Total	8.2	43.7	48.1
First-generation student	12.4	41.0	46.6
Not a first-generation student	6.5	44.9	48.7
Parents have some college	8.2	43.0	48.8
Parents have bachelor's or advanced degree	5.8	45.6	48.6
Public 2-year			
Total	35.6	44.9	19.5
First-generation student[1]	39.7	46.5	13.8
Not a first-generation student[1]	28.5	46.6	24.9
Parents have some college	30.5	39.4	30.1
Parents have bachelor's or advanced degree	26.9	52.2	20.9
Private, for-profit			
Total	28.7	45.0	26.3
First-generation student[1]	29.1	44.8	26.2
Not a first-generation student[1]	26.9	43.3	29.7
Parents have some college	31.2	41.3	27.5
Parents have bachelor's or advanced degree	19.6	46.9	33.6
Other less-than-4-year[2]			
Total	27.3	41.6	31.1
First-generation student	33.7	37.7	28.7
Not a first-generation student	17.9	47.8	34.3
Parents have some college	18.4	48.1	33.5
Parents have bachelor's or advanced degree	17.4	47.4	35.1

[1]Values for totals may not be within range of subgroup values due to missing cases on the subgroup variables.

[2] Includes students enrolled in private, not-for-profit 2-year and less-than-2-year institutions and public less-than-2-year institutions.

NOTE: Academic integration index is a composite based on how often student reported attending career-related lectures, participating in study groups with other students, talking about academic matter with faculty, or meeting with an advisor concerning academic plans. Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Similar proportions of first-generation and non-first-generation students (47 and 48 percent) reported moderate levels of academic integration. Students whose parents had at least some college were more likely than their first-generation counterparts to have a high academic integration score (33 percent versus 23 percent). In addition, when the average academic integration scores were examined, among all students, first-generation students had a lower average score (2.3) than non-first-generation students (2.5) (table 17).

Differences in levels of academic integration according to first-generation status varied with the type of institution students attended. For example, at private, not-for-profit 4-year institutions, first-generation students were somewhat more likely than their non-first-generation counterparts to report low levels of integration (12 percent versus 7 percent) and equally as likely to report high and moderate levels (47 versus 49 percent high, 41 percent versus 45 percent moderate) (table 16). At public 2-year institutions, first-generation students were more likely than their counterparts to report low levels of academic integration (40 percent versus 29 percent) and less likely to report high levels (14 percent versus 25 percent) (table 16). First-generation students in public 2-year institutions also had a lower average index score for academic integration (2.1) than non-first-generation students (2.3), as did students in other less-than-4-year institutions (2.3 vs. 2.5). However, in other types of institutions, the average academic integration scores of both groups of students did not differ (table 17).

Table 17—Average academic integration score of 1989–90 beginning postsecondary students, by institution type and first-generation status

	Total	Public 4-year	Private, not-for-profit 4-year	Public 2-year	Private, for-profit	Other less-than-4-year
Total	2.4	2.6	2.8	2.2	2.3	2.4
First-generation student	2.3	2.5	2.8	2.1	2.3	2.3
Not a first-generation student	2.5	2.6	2.8	2.3	2.4	2.5
Parents have some college	2.5	2.5	2.8	2.3	2.3	2.6
Parents have bachelor's or advanced degree	2.5	2.6	2.8	2.3	2.6	2.5

NOTE: Academic integration index is a composite based on how often a student reported attending career-based lectures, participating in study groups with other students, talking about academic matters with faculty, or meeting with an advisor concerning academic plans.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Social Integration

In addition to having lower levels of academic integration, first-generation students also had lower levels of social integration in the college environment than their non-first-generation counterparts. As parental education increased from a high school diploma or less (17 percent) to some college (23 percent) to a bachelor's or advanced degree (33 percent), the likelihood of having high levels of social integration increased (table 18). In general, first-generation students were less likely than students whose parents had some college or had attained at least a bachelor's degree to have high levels of social integration (17 percent versus 29 percent), and more likely to have low levels (38 percent versus 19 percent). These general patterns also held when institutions were examined separately, except for students in private, for-profit and other less-than-4-year institutions (table 18).[17] As suggested earlier, these lower scores in social integration may be related to the fact that first-generation students tend to be older than non-first-generation students, and may have less time or interest in participating in these kinds of activities.[18] Alternatively, cultural differences, such as the value that students' families place on attaining a post-secondary education credential, may influence the extent to which students whose parents have different educational levels choose to involve themselves in the institutional community.

When the average social integration scores were examined, among all students, first-generation students showed a lower average level of social integration (1.9) than non-first-generation students (2.2) (table 19). Differences in the scores between these two groups of students varied according to the kind of institution attended. For example, in public 4-year and private, not-for-profit 4-year institutions, first-generation students had lower average index scores for social integration than other students (2.2 versus 2.3, and 2.4 versus 2.6, respectively). First-generation students in public 2-year institutions also scored lower (1.8) than non-first-generation students (2.0). There were no measurable differences, however, between the average social integration scores of first-generation and other students at private, not-for-profit and other less-than-4-year institutions. While it appears that the index scores differ for students in other less-than-4-year institutions, there was not enough statistical evidence to conclude that they are different (table 19).

[17]First-generation students in public 2-year institutions were less likely to report moderate levels of integration than their counterparts (42 percent versus 55 percent).

[18]As with academic integration, there was an association between age and low levels of social integration. With the exception of the difference between the proportions of 25–29-year-olds and those 30 or older on low scores of social integration, as age increased, the likelihood of a low score on social integration also increased. Conversely, with the exception of a difference between those in the 25–29 and 30 or older age groups, as age increased, the likelihood of a high score on social integration decreased (BPS:90/94 DAS).

Table 18—Percentage distribution of 1989–90 beginning postsecondary students according to social integration levels in 1989–90, by first-generation status and institution type

	Integration index		
	Low score	Moderate score	High score
Total	28.6	48.4	23.0
First-generation student	37.8	45.5	16.7
Not a first-generation student	19.0	52.4	28.6
Parents have some college	22.0	55.5	22.5
Parents have bachelor's or advanced degree	16.9	50.4	32.7
Public 4-year			
Total	15.1	55.1	29.8
First-generation student	21.5	53.7	24.8
Not a first-generation student	11.6	56.3	32.1
Parents have some college	14.4	57.1	28.5
Parents have bachelor's or advanced degree	10.0	55.8	34.3
Private, not-for-profit 4-year			
Total	9.2	42.1	48.7
First-generation student	17.4	41.8	40.8
Not a first-generation student	5.8	42.4	51.8
Parents have some college	9.5	45.4	45.1
Parents have bachelor's or advanced degree	4.3	41.3	54.5
Public 2-year			
Total	40.6	46.6	12.9
First-generation student	48.3	42.2	9.5
Not a first-generation student	28.8	55.0	16.2
Parents have some college	29.1	59.0	12.0
Parents have bachelor's or advanced degree	28.7	51.9	19.4
Private, for-profit			
Total	39.7	46.7	13.6
First-generation student[1]	38.5	46.9	14.6
Not a first-generation student[1]	38.1	47.0	14.9
Parents have some college	36.9	49.4	13.7
Parents have bachelor's or advanced degree	40.1	43.0	16.9
Other less-than-4-year[2]			
Total	29.8	49.5	20.7
First-generation student[1]	30.3	51.6	18.0
Not a first-generation student[1]	24.5	50.4	25.1
Parents have some college	23.0	54.6	22.4
Parents have bachelor's or advanced degree	26.1	46.1	27.8

[1]Values for totals may not be within range of subgroup values due to missing cases on the subgroup variables.

[2]Includes students enrolled in private, not-for-profit 2-year and less-than-2-year institutions and public less-than-2-year institutions.

NOTE: Social integration index is a composite based on how often student reported having contact with faculty outside of class, going places with friends from school, or participating in student assistance centers/programs or school clubs. Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Table 19—Average social integration score of 1989–90 beginning postsecondary students, by institution type and first-generation status

	Total	Public 4-year	Private, not-for-profit 4-year	Public 2-year	Private, for-profit	Other less-than-4-year
Total	2.1	2.3	2.6	1.9	1.9	2.0
First-generation student	1.9	2.2	2.4	1.8	1.9	2.0
Not a first-generation student	2.2	2.3	2.6	2.0	1.9	2.1
Parents have some college	2.1	2.3	2.5	1.9	1.9	2.1
Parents have bachelor's or advanced degree	2.3	2.4	2.7	2.1	1.9	2.2

NOTE: Social integration index is a composite based on how often student reported having contact with faculty outside of class, going places with friends from school, or participating in student assistance centers/programs or school clubs.

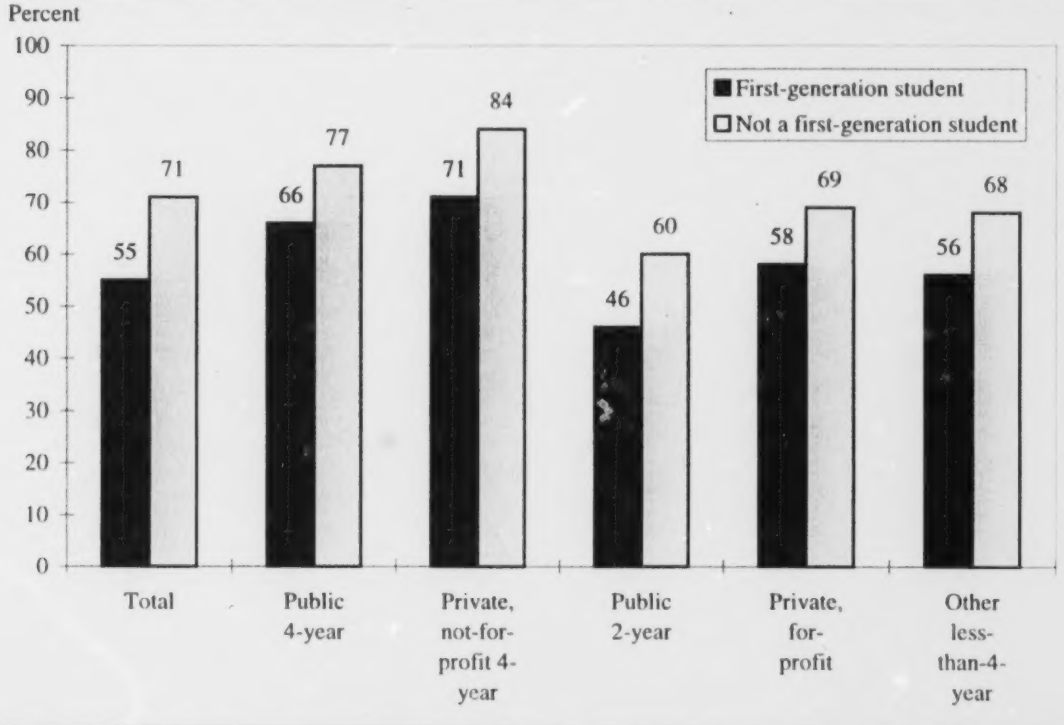
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

Persistence and Attainment

Whether or not a student attained a degree or was still enrolled in postsecondary education was strongly associated with his or her parents' education level (figure 5).

Over half (55 percent) of first-generation students had attained a degree or were still enrolled by 1994, yet first-generation students who began their postsecondary education in 1989–90

Figure 5—Percentage of 1989–90 beginning postsecondary students who attained a degree or were enrolled as of 1994,* by first-generation status and first institution type



*Either attained any degree or enrolled in the spring of 1994.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

were much less likely than non-first-generation students to have either attained a degree or to be enrolled in postsecondary education 5 years after their initial enrollment.[19] About 44 percent of first-generation students had attained a postsecondary degree or certificate by the spring of 1994, compared with 56 percent of their non-first-generation counterparts; 11 percent of first-generation students were still enrolled at the time of follow-up, compared with 16 percent of non-first-generation students. Almost half (45 percent) of first-generation students had attained no degree and were no longer enrolled by follow-up, compared with less than one-third (29 percent) of other students (table 20). As parental education levels rose, so did the likelihood of persistence (i.e., attained or still enrolled), from 55 percent for first-generation students to 65 percent for students whose parents had some college, and to 76 percent for those whose parents had a bachelor's degree or higher (table 20).

With respect to the type of degree attained, first-generation students were less likely than other students to have attained a bachelor's degree (13 percent versus 33 percent) and more likely to have attained a vocational certificate (18 percent versus 9 percent). As parental education rose, the likelihood of students attaining a bachelor's degree increased markedly, while the likelihood of attaining a certificate decreased. On the other hand, the likelihood of having attained an associate's degree did not differ according to first-generation status (13 percent versus 14 percent) (table 20). Underscoring the strong association of parents' education level with students' persistence and attainment, there were also differences in persistence and attainment rates between first-generation students and students whose parents had some college experience but never attained a bachelor's degree. Students whose parents had some college experience but had attained less than a bachelor's degree were more likely than first-generation students to persist, to attain any sort of degree, to earn a certificate, and to earn a bachelor's degree (table 20).

When differences in persistence and attainment were examined according to institution type, the results held for students who began at public 4-year and private, not-for-profit 4-year institutions. While a majority of first-generation students at these institutions had attained a degree or were still enrolled as of 1994 (66 percent at public 4-year and 71 percent at private, not-for-profit 4-year institutions), first-generation students from both types of 4-year institutions were less likely to have persisted overall than their non-first-generation counterparts. After 5 years, 34 percent of first-generation students from public 4-year institutions and 29 percent of those from private, not-for-profit 4-year institutions had no degree and were no longer enrolled, compared with 23 percent and 16 percent, respectively, of their counterparts (table 20). About one-third (34

[19]Since these students were interviewed only 5 years after they began their postsecondary education, not enough time had elapsed to determine if the students who were no longer enrolled were taking time off from school and planning to return to complete their education or whether they had decided not to continue.

Table 20—Percentage distribution of 1989–90 beginning postsecondary students according to persistence and attainment status as of 1994, by first-generation status and institution type

	Attained or still enrolled			No degree, not enrolled	First degree attained			
	Attained degree	No degree, enrolled	Total		No degree	Certificate	Associate's degree	Bachelor's degree
Total	50.0	13.3	63.2	36.8	50.1	13.5	13.1	23.3
First-generation student	44.2	10.7	55.0	45.1	55.8	18.0	12.9	13.3
Not a first-generation student	55.5	15.9	71.3	28.6	44.5	9.0	14.0	32.5
Parents have some college	50.6	14.5	65.1	34.9	49.4	11.8	14.6	24.2
Parents have bachelor's or advanced degree	58.8	16.9	75.7	24.3	41.2	7.2	13.6	38.1
Public 4-year								
Total	54.8	18.4	73.2	26.8	45.2	3.4	5.5	46.0
First-generation student	46.4	19.8	66.1	33.9	53.7	6.2	6.1	34.1
Not a first-generation student	58.9	18.0	76.9	23.1	41.1	2.0	5.1	51.8
Parents have some college	53.3	17.4	70.7	29.3	46.7	1.5	5.7	46.2
Parents have bachelor's or advanced degree	62.3	18.3	80.7	19.3	37.7	2.3	4.8	55.3
Private, not-for-profit 4-year								
Total	71.9	8.6	80.5	19.5	28.1	2.9	4.5	64.5
First-generation student	62.9	8.2	71.1	28.9	37.1	3.2	4.6	55.1
Not a first-generation student	75.8	8.6	84.4	15.6	24.2	2.8	4.5	68.5
Parents have some college	70.6	8.5	79.2	20.9	29.4	4.3	6.0	60.3
Parents have bachelor's or advanced degree	77.9	8.6	86.5	13.5	22.1	2.2	3.9	71.9
Public 2-year								
Total	36.7	14.7	51.4	48.6	63.3	13.4	20.9	2.5
First-generation student	35.4	10.8	46.2	53.8	64.6	14.7	18.4	2.3
Not a first-generation student	39.8	20.1	60.0	40.1	60.2	10.9	26.0	3.0
Parents have some college	36.8	17.5	54.3	45.7	63.2	11.2	24.3	1.3
Parents have bachelor's or advanced degree	42.2	22.2	64.4	35.6	57.8	10.6	27.4	4.3
Private, for-profit								
Total	59.6	1.9	61.4	38.6	40.4	48.0	10.8	0.8
First-generation student	56.8	1.6	58.4	41.6	43.2	47.5	8.4	0.8
Not a first-generation student	65.9	3.0	68.9	31.1	34.1	49.8	15.1	1.1
Parents have some college	69.3	1.5	70.8	29.2	30.7	52.6	15.6	1.1
Parents have bachelor's or advanced degree	60.2	5.6	65.8	34.2	39.8	45.0	14.2	0.9
Other less-than-4-year*								
Total	54.4	7.6	62.0	38.0	45.6	37.5	15.5	1.4
First-generation student	51.0	5.3	56.3	43.7	49.0	38.6	12.2	0.3
Not a first-generation student	57.5	11.0	68.4	31.6	42.5	33.6	21.1	2.9
Parents have some college	57.3	8.1	65.3	34.7	42.8	41.4	14.2	1.7
Parents have bachelor's or advanced degree	57.7	14.0	71.7	28.3	42.3	25.4	28.3	4.1

*Includes students enrolled in private, not-for-profit 2-year and less-than-2-year institutions and public less-than-2-year institutions.

NOTE: Details may not sum to total due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

percent) of first-generation students in public 4-year institutions and over half (55 percent) in private, not-for-profit 4-year institutions had earned bachelor's degrees after five years. Among those who began at both public and private, not-for-profit 4-year institutions, first-generation students were also less likely to have attained bachelor's degrees than were non-first-generation students.

First-generation students were also less likely than students whose parents had attended some college but earned less than a bachelor's degree to have attained bachelor's degrees after beginning at public 4-year institutions (34 percent versus 46 percent). On the other hand, at private, not-for-profit 4-year institutions, first-generation students appeared as likely as these other students to attain bachelor's degrees (55 percent and 60 percent, respectively) (table 20).

When examining proportions of students who had attained a degree or were still enrolled after 5 years, at public 4-year institutions, first-generation students were no less likely than students whose parents had some college but less than a bachelor's degree to either still be enrolled or have attained a degree (66 percent versus 71 percent). While they were as likely to have attained bachelor's degrees from private, not-for-profit 4-year institutions, first-generation students were less likely to either still be enrolled and have attained a degree after 5 years than students whose parents had some college experience but had not received a bachelor's degree (71 percent versus 79 percent). This suggests that from public 4-year institutions, first-generation students had similar persistence rates as students whose parents had some postsecondary education, but they may have been taking longer to finish. However, although they attained degrees at similar rates as their counterparts, it appears that first-generation students were less likely than students whose parents had postsecondary experience below a bachelor's degree to remain enrolled in private, not-for-profit 4-year institutions.

Among those who began at public 2-year institutions, after 5 years, first-generation students were also less likely than their counterparts to have attained degrees or to be enrolled in 1994 (46 percent versus 60 percent). While there were no significant differences in the proportions of students who earned any degrees (35 percent first-generation versus 40 percent non-first-generation), a lower proportion of first-generation students (11 percent) than non-first-generation students (20 percent) were still enrolled and working toward a degree after 5 years. However, there is some evidence that first-generation students may have transferred without a degree from 2-year to 4-year institutions in higher proportions than their counterparts.[20] Of all students who

[20]See U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS: 90/94), Data Analysis System. Of all 1989 beginning postsecondary students, 35 percent had transferred to another institution by 1994. Of those who had attended more than one institution by the 1994 follow-up, 12 percent had earned an associate's degree and 4 percent had earned a certificate at the first institution in which they

had persisted in 4-year public or private, not-for-profit institutions until 1994, first-generation students were more likely than non-first-generation students (31 percent versus 25 percent) to have transferred during the previous 5 years. But first-generation students who had persisted in these institutions were no more likely than their peers to hold associate's degrees (8 percent versus 6 percent). This finding suggests that this particular group of first-generation students were actually still enrolled, but in a different postsecondary education sector, after 5 years. In comparing the persistence of first-generation students and their counterparts whose parents had some college experience but no bachelor's degree, first-generation students were as likely as members of this other group to persist and to attain any degrees.

When beginning at private, for-profit institutions, a lower percentage of first-generation students (58 percent) than non-first-generation students (69 percent) had either attained a degree or were still enrolled after 5 years. While the proportions who earned certificates were similar among the two groups, almost twice as many non-first-generation students (15 percent) as first-generation students (8 percent) had earned associate's degrees. There was not enough statistical evidence to conclude that the persistence of first-generation students differed from that of their non-first-generation counterparts in less-than-4-year institutions other than what was described above (table 20).[21]

In terms of the relationship across institution types and persistence and attainment, similar to their counterparts whose parents have any postsecondary education, first-generation students were more likely to persist when they began at 4-year public and 4-year private, not-for-profit institutions than they were from public 2-year institutions (table 20). This is consistent with findings in other studies demonstrating that undergraduates are more likely to persist at 4-year institutions than they are at 2-year public institutions.[22]

In light of research linking part-time enrollment status to a lower probability of persistence and attainment,[23] it is also important to consider enrollment status when examining educational outcomes. Among those attending full time, first-generation students remained less likely than non-first-generation students to persist after beginning at 4-year public and 4-year private, not-for-profit institutions (table 21). On the other hand, first-generation students initially enrolled full

enrolled. See A. McCormick, *Transfer Behavior Among Beginning Postsecondary Students: 1989–94* (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 1997), tables 2 and 4.

[21]These institutions included private, not-for-profit 2-year; private, not-for-profit less-than-2-year; and public less-than-2-year institutions.

[22]L. Berkner, S. Cuccaro-Alamin, and A. McCormick, *Descriptive Summary of 1989-90 Beginning Postsecondary Students: 5 Years Later* (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 1996).

[23]U.S. Department of Education, National Center for Education Statistics. *The Condition of Education 1997* (Washington, DC: 1997), 38–39.

Table 21—Percentage distribution of 1989–90 full-time beginning postsecondary students according to persistence and attainment status as of 1994, by first-generation status and institution type

	Attained or still enrolled			No degree, not enrolled	First degree attained			
	Attained degree	No degree, enrolled	Total		No degree	Certificate	Associate's degree	Bachelor's degree
Total	57.8	13.0	70.8	29.2	42.3	11.8	15.3	30.6
First-generation student[1]	52.8	10.3	63.1	36.9	47.2	17.2	16.0	19.6
Not a first-generation student[1]	60.8	15.0	75.8	24.2	39.2	7.7	15.3	37.8
Parents have some college	56.8	12.6	69.3	30.6	43.2	10.7	16.6	29.5
Parents have bachelor's or advanced degree	63.3	16.5	79.8	20.2	36.7	5.8	14.4	43.1
Public 4-year								
Total	57.6	18.3	75.9	24.1	42.4	3.1	5.3	49.2
First-generation student	47.8	20.5	68.4	31.7	52.2	5.1	5.6	37.1
Not a first-generation student	61.4	17.5	78.9	21.1	38.6	2.1	5.0	54.3
Parents have some college	55.7	17.7	73.3	26.7	44.4	1.2	5.3	49.2
Parents have bachelor's or advanced degree	64.8	17.3	82.1	17.9	35.2	2.6	4.8	57.3
Private, not-for-profit 4-year								
Total	76.0	7.7	83.7	16.3	24.0	2.6	4.7	68.7
First-generation student	67.6	6.8	74.4	25.6	32.4	2.3	4.8	60.6
Not a first-generation student	79.1	7.9	87.0	13.0	20.9	2.7	4.6	71.8
Parents have some college	74.0	8.0	82.0	18.0	26.0	3.5	6.1	64.4
Parents have bachelor's or advanced degree	81.1	7.9	89.0	11.0	18.9	2.3	4.0	74.8
Public 2-year								
Total	45.9	14.6	60.5	39.5	54.1	11.4	30.2	4.4
First-generation student	46.7	8.6	55.4	44.7	53.3	13.2	28.4	5.1
Not a first-generation student	45.8	19.5	65.3	34.7	54.2	8.8	32.9	4.1
Parents have some college	45.0	13.5	58.5	41.5	55.0	10.2	32.7	2.1
Parents have bachelor's or advanced degree	46.3	23.8	70.1	29.9	53.7	7.8	33.1	5.5
Private, for-profit								
Total	65.8	1.5	67.3	32.7	34.2	51.1	14.0	0.7
First-generation student	62.7	1.9	64.6	35.4	37.3	51.5	10.8	0.5
Not a first-generation student	71.3	1.2	72.5	27.5	28.7	50.6	19.5	1.2
Parents have some college	71.9	0.9	72.7	27.3	28.1	51.2	19.7	1.0
Parents have bachelor's or advanced degree	70.1	1.9	72.0	28.0	29.9	49.4	19.1	1.6
Other less-than-4-year[2]								
Total	59.0	5.6	64.6	35.4	41.0	38.2	18.9	1.9
First-generation student	55.3	4.2	59.5	40.5	44.7	38.3	16.6	0.4
Not a first-generation student	62.5	7.1	69.6	30.4	37.5	36.3	22.5	3.7
Parents have some college	65.9	0.7	66.7	33.4	34.1	46.4	17.3	2.2
Parents have bachelor's or advanced degree	59.1	13.4	72.5	27.6	40.9	26.3	27.7	5.1

[1]Values for totals may not be within range of subgroup values due to missing cases on the subgroup variables.

[2]Includes students enrolled in private, not-for-profit 2-year and less-than-2-year institutions and public less-than-2-year institutions.

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

time in public 2-year institutions had similar persistence and attainment rates as those of their non-first-generation counterparts. Comparing across institution types, full-time first-generation students from public 4-year institutions had lower attainment rates (48 percent) than first-generation students from 4-year private, not-for-profit institutions (68 percent). While their persistence rates also appeared lower after beginning at public 4-year institutions, compared with 4-year private, not-for-profit institutions (68 percent versus 74 percent), there was not enough evidence to conclude that first-generation students' levels of persistence by each type of institution were different (table 21). This finding suggests that first-generation students from public 4-year institutions may have been taking a longer time to finish their degrees. Full-time first-generation students from public 2-year institutions were as likely to attain degrees as their counterparts from 4-year public institutions. While it appears that first-generation students were less likely to persist when initially enrolling at public 2-year institutions than at public 4-year institutions (61 percent versus 76 percent), there is not enough statistical evidence to conclude that they are different. Consistent with the findings for all first-generation students, when controlling for full-time enrollment status, first-generation students from 2-year public institutions were less likely either to attain degrees or persist than first-generation students from 4-year private not-for-profit institutions.

Labor Market Outcomes

As described earlier in this report, being well-off financially, being able to find steady work, and being able to give their own children better opportunities were more important to first-generation students than to those whose parents had bachelor's degrees. To examine whether degree attainment is an equalizing force in the occupational and social status of students who had completed their degrees by 1994, this section analyzes 1989–90 beginning students' occupations as reported in the 1994 follow-up survey.

The labor market analysis was conducted separately for students who had attained subbaccalaureate credentials (associate's degrees and certificates) and those who had earned bachelor's degrees. BPS:90/94 data were used for subbaccalaureate students, and B&B:93/94 data were used for bachelor's degree recipients. A general analysis of employment outcomes for students who did not attain a degree and were no longer enrolled according to age was also conducted using BPS:90/94 data.

For subbaccalaureate degree recipients and for those not seeking a degree, labor market participation was determined by their principal job in 1993, while for bachelor's degree recipients it was determined by their principal job as of April 1994. Measures of labor market participation included whether they were employed, their occupation, whether their occupation was related to their major, and whether they needed their education and training to get their principal job. For bachelor's degree recipients, starting salaries as of April 1994 were also examined after controlling for gender.

The results of this study show that similar proportions of first-generation students who received certificates, associate's, or bachelor's degrees were employed as their counterparts with similar degrees (99 percent versus 91 percent certificate; 92 percent versus 87 percent associate's; 89 percent versus 86 percent bachelor's). On average, 89 percent of associate's degree recipients, 96 percent of certificate completers, and 87 percent of bachelor's degree completers were employed when they were followed up in 1993 or 1994 (table 22).

Among associate's degree recipients, although it appears that first-generation students were less likely to report that they had taken a job unrelated to their educational training than other

Table 22—Percentage of 1989–90 beginning postsecondary students with various employment characteristics, and of those employed, percentage distribution according to occupation, by first-generation student status and degree attained

	Employed April 1994	Job different from education and training[1]	Could have obtained job without education[1]	Occupation							
				Clerical	Crafts-man	Manager	Profess-ional	Sales	Service	Technical	Other
Certificate recipients (BPS)											
Total	95.7	25.4	30.1	24.3	20.8	9.5	6.8	4.6	24.3	6.6	3.2
First-generation student[2]	98.7	25.2	29.6	26.8	21.6	9.5	7.3	4.4	22.7	5.6	2.0
Not a first-generation student[2]	91.0	27.4	29.9	21.9	17.3	10.7	6.2	5.8	25.7	7.6	4.9
Parents have some college	91.3	22.5	35.9	20.4	21.8	12.0	5.6	7.4	24.3	8.3	0.2
Parents have bachelor's or advanced degree	90.7	30.3	26.2	23.3	12.9	9.3	6.7	4.2	27.0	6.9	9.6
Associate's degree recipients (BPS)											
Total	89.0	28.9	29.2	28.7	8.3	14.6	12.4	6.0	16.2	8.3	5.5
First-generation student[2]	92.2	21.1	27.2	28.8	6.9	19.2	10.0	3.6	16.8	7.8	7.0
Not a first-generation student[2]	86.5	35.3	29.9	29.4	8.5	10.8	14.2	7.9	16.3	8.5	4.4
Parents have some college	89.2	36.9	29.6	29.7	9.1	18.6	10.6	8.8	13.3	8.2	1.7
Parents have bachelor's or advanced degree	84.6	33.5	30.3	29.2	8.0	4.9	17.0	7.3	18.6	8.8	6.3
Bachelor's degree recipients (B&B)											
Total	87.0	25.0	55.9	17.9	3.2	19.6	26.2	7.1	17.4	7.8	0.9
First-generation student	88.7	22.5	54.1	18.6	3.0	19.4	25.4	6.4	18.3	8.3	0.7
Not a first-generation student	86.1	26.0	57.2	17.6	3.2	19.7	26.4	7.4	17.1	7.7	0.9
Parents have some college	88.9	24.6	57.4	17.2	2.7	21.5	26.1	8.4	15.9	7.1	1.1
Parents have bachelor's or advanced degree	85.0	26.5	57.1	17.7	3.4	19.0	26.6	7.0	17.6	8.0	0.8
No degree, no longer enrolled—total (BPS)											
Total	99.0	39.3	61.8	24.2	20.1	18.0	5.8	7.0	13.7	3.4	7.9
First-generation student	99.0	37.5	59.0	23.5	23.5	12.9	5.4	7.6	15.5	4.2	7.3
Not a first-generation student	98.9	43.0	70.6	24.5	16.5	22.4	6.0	7.0	12.5	2.9	8.2
Parents have some college	99.9	37.6	69.6	22.8	17.8	23.8	4.7	7.8	11.2	1.7	10.3
Parents have bachelor's or advanced degree	97.9	47.8	71.4	26.2	15.2	21.0	7.2	6.3	13.8	4.0	6.2

Table 22—Percentage of 1989–90 beginning postsecondary students with various employment characteristics, and of those employed, percentage distribution according to occupation, by first-generation student status and degree attained—Continued

	Employed April 1994	Job different from education and training[1]	Could have obtained job without education[1]	Occupation							
				Clerical	Craftsman	Manager	Professional	Sales	Service	Technical	Other
No degree, no longer enrolled—younger than 23 years (BPS)											
Total	99.1	45.1	66.6	24.7	21.4	18.0	5.0	7.7	12.6	3.2	7.5
First-generation student	98.8	40.8	59.2	23.5	26.6	14.7	4.9	8.1	12.5	3.3	6.5
Not a first-generation student	99.5	48.4	73.1	25.8	16.3	21.7	5.2	7.1	12.8	3.1	8.1
Parents have some college	99.9	48.9	70.2	25.4	17.2	23.0	2.4	8.2	11.5	1.9	10.3
Parents have bachelor's or advanced degree	99.0	48.1	75.1	26.0	15.5	20.6	7.5	6.3	13.9	4.1	6.2
No degree, no longer enrolled—23 years or older (BPS)											
Total	98.4	27.7	52.3	22.5	16.0	18.0	8.5	4.6	17.2	4.0	9.3
First-generation student[2]	99.5	31.2	58.6	23.5	15.1	7.8	7.0	6.3	24.1	6.6	9.6
Not a first-generation student[2]	93.9	—	—	12.3	18.8	28.9	14.3	5.9	9.9	0.6	9.4
Parents have some college	100.0	—	—	6.4	21.5	28.7	18.7	5.3	8.9	0.0	10.5
Parents have bachelor's or advanced degree	—	—	—	—	—	—	—	—	—	—	—

—Sample size too small for reliable estimate.

[1]These figures are for employed students only.

[2]Values for totals may not be within range of subgroup values due to missing cases on the subgroup variables.

NOTE: Details may not sum to total due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94) and Baccalaureate and Beyond Longitudinal Study (B&B:93/94), Data Analysis Systems.

students with similar degrees (21 percent versus 35 percent), there was not enough statistical evidence to conclude that this was the case (table 22). Among bachelor's degree recipients, similar proportions of both groups of students reported that they could have obtained their job without their education (54 percent versus 57 percent). However, first-generation students were somewhat less likely than other students to report taking a job unrelated to their educational training (23 percent versus 26 percent) (table 22).

Overall, when controlling for type of degree attained, there were no observed differences in occupation between first-generation students and their non-first-generation counterparts. Additionally, no differences were found in average annual salaries as of April 1994 among bachelor's degree recipients according to first-generation status: both first-generation and non-first-generation students earned roughly $23,000, on average (table 23).[24] Although males had considerably higher salaries than females,[25] when salaries were examined separately for male and female bachelor's degree recipients, there were still no differences in earnings according to first-generation status (male $26,339 versus $25,816; female $20,368 versus $20,753). While it appears that the average salaries of females whose parents have some college are higher than those of females whose parents have bachelor's degrees, there was not enough statistical evidence to conclude that they are different.

Table 23—Annual salary of bachelor's degree recipients as of April 1994, by gender and first-generation status

	Annual salary as of April 1994		
	Male	Female	Total
Total	$25,978	$20,663	$23,026
First-generation student	26,339	20,368	22,887
Not a first-generation student	25,816	20,753	23,044
Parents have some college	23,440	23,236	23,326
Parents have bachelor's or advanced degree	26,744	19,700	22,929

SOURCE: U.S. Department of Education, National Center for Education Statistics, Baccalaureate and Beyond Longitudinal Study (B&B:93/94), Data Analysis System.

[24]Likewise, there were no significant differences in the 1993 salaries of students who had at most attained an associate's degree or certificate by 1994 according to first-generation status. The total salaries of male and female certificate holders ($20,595 versus $12,704) differed significantly. (U.S. Department of Education, National Center for Education Statistics, Beginning Postsecondary Students [BPS:90/94], Data Analysis System.)

[25]The gender differences in earnings are statistically significant overall, and among both first-generation students and non-first-generation students.

Among students who did not attain a postsecondary credential within 5 years and were no longer enrolled in postsecondary education, there were few differences in the employment attributes of both groups according to first-generation status, except for two characteristics. First-generation students were more likely to report working in the craftsman trades (24 percent versus 17 percent), and were less likely to report working in a managerial occupation (13 percent versus 22 percent) (table 22).

In this analysis, employment outcomes for students who received no degree and were no longer enrolled were also examined. This analysis further took into consideration age, because first-generation students tend to be older, and older individuals tend to have more experience in the labor market. Although no overall differences were observed in the employment rates of students who attained no degree and were no longer enrolled according to first-generation status after controlling for age, there were some occupational differences (table 22). Similar to the results found for all students who did not earn postsecondary credentials within 5 years, among those under 23 years old who had not attained a degree and were no longer enrolled, first-generation students were more likely than other students to be employed in the craftsman trades (27 percent versus 16 percent), and less likely to hold managerial positions (15 percent versus 22 percent) (table 22). Among those older than 23, first-generation students were more likely than other students to hold clerical positions (24 percent versus 12 percent), and more likely to be employed in the service sector (24 percent versus 10 percent) (table 22).

Graduate School Enrollment

The final analysis in this study examined the rate of graduate school enrollment relative to parents' educational level. As of 1994, first-generation students were less likely than their counterparts whose parents had more than a high school education to be enrolled in graduate school (23 percent versus 30 percent) (table 24). Among students who did enroll in graduate school, there were also differences according to first-generation student status in the types of programs in which students enrolled. At the same time, however, the majority of students who enrolled in graduate study were in master's degree programs, where first-generation students were as likely as non-first-generation students to be enrolled (46 percent and 43 percent) (table 24). Within other types of graduate programs, students whose parents had more than a high school education were somewhat more likely than first-generation students to enroll in postbaccalaureate certificate programs (4 percent versus 2 percent), first-professional programs (10 percent versus 6 percent) and doctoral degree programs (6 percent versus 3 percent) (table 24).

Table 24—Percentage of bachelor's degree recipients enrolled in graduate school, and of those enrolled, percentage distribution according to type of degree program as of April 1994, by first-generation status

		Graduate degree					
	Enrolled	No degree	Post-bachelor's certificate	Master's degree	Doctoral degree	First professional degree	Other
Total	27.3	21.2	3.3	43.7	4.8	9.1	17.9
First-generation student	23.0	21.5	1.7	45.5	2.6	6.0	22.7
Not a first-generation student	29.5	21.2	3.7	43.4	5.7	10.2	15.9
Parents have some college	27.6	21.1	3.8	49.1	3.4	6.1	16.5
Parents have bachelor's or advanced degree	30.2	21.2	3.7	41.4	6.5	11.7	15.7

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Baccalaureate and Beyond Longitudinal Study (B&B:94), Data Analysis System.

Influence of Demographic, Institutional, Enrollment, and Integration Characteristics on Persistence and Attainment

As described in this report, in addition to having parents who had never enrolled in postsecondary education, first-generation students have particular demographic, institutional, enrollment, and school integration characteristics that distinguish them from their non-first-generation peers. In order to measure the relationship of a single variable, such as first-generation status, to persistence and attainment, one must control for the effects of related variables. In this analysis, a weighted least squares regression model was used to measure how each of these various factors affected persistence and attainment. In the model, the dependent variable is defined as having attained any degree or being enrolled at the time of the 1994 follow-up survey. In addition to parents' education, the independent variables in the model included gender, age, SES, race–ethnicity, and institutional type (4-year, public 2-year, and other less-than-4-year public and private, not-for-profit institutions). Whether or not students attended full time or part time and how integrated they were, both academically and socially, were also included in the model. Finally, the analysis was based on only those students who indicated when they began postsecondary education that their objective was to earn a credential (vocational certificate, associate's, or bachelor's degree). The regression coefficients were subsequently used to adjust the original estimates of persistence and attainment, taking into account the joint effects of all the independent variables (see appendix B for methodology details).

The results of the analysis are displayed in table 25. The original (unadjusted) estimates of the proportion of students who had attained or persisted in 1994 are listed in the first column, and the adjusted percentages after controlling for the variation of all other variables are listed in the second column. Asterisks in these columns identify cases where the percentage of students in a given category who had attained or persisted is significantly different from that of the reference group (italicized). For example, part-time enrollment (unadjusted) was associated with lower rates of persistence and attainment than was full-time enrollment (48 percent versus 71 percent). This pattern held even after controlling for all other characteristics in the model (60 percent versus 67 percent, adjusted).

Table 25—Among 1989–90 beginning students who indicated plans to attain a vocational certificate, associate's, or bachelor's degree, the percentage who were enrolled in or had attained a degree within five years, and the percentage after taking into account the covariation of the variables in the table: 1989–94

	Unadjusted percentage[1]	Adjusted percentage[2]	WLS coefficient[3]	Standard error[4]
Total	65.6	65.6	81.5	(†)
First-generation status				
First-generation student	57.4*	61.6*	-7.0	1.8
Not a first-generation student	*73.1*	*68.6*	*(†)*	*(†)*
Enrollment status 1989–90				
Part-time	47.9*	59.5*	-7.6	3.5
Full-time	*71.3*	*67.0*	*(†)*	*(†)*
Age as of 12/31/89				
18 years or younger	*73.8*	*68.7*	*(†)*	*(†)*
19–24 years old	58.0*	61.3*	-7.4	1.8
25 years or older	47.5*	61.8*	-7.0	3.5
Gender				
Male	64.4	64.0*	-3.1	1.5
Female	*66.7*	*67.0*	*(†)*	*(†)*
Race–ethnicity				
Black, non-Hispanic	55.7*	57.1*	-8.1	3.4
Hispanic	65.9	72.7	7.4	3.8
Asian/Pacific Islander	77.0*	76.0*	10.6	4.1
American Indian/Alaskan native	77.0	83.0	17.7	9.3
White, non-Hispanic	*66.2*	*65.3*	*(†)*	*(†)*
Level and control of first institution				
4-year	*77.0*	*70.3*	*(†)*	*(†)*
Public 2-year	55.0*	59.8*	-10.5	3.1
Other private or public less-than-4-year	62.5*	68.6	-1.7	3.2
Academic integration				
Low score	51.3*	60.2*	-6.7	2.2
Moderate score	*67.7*	*66.9*	*(†)*	*(†)*
High score	73.4*	68.0	1.1	2.0
Social integration				
Low score	49.2*	59.1*	-8.3	2.7
Moderate score	*69.2*	*67.4*	*(†)*	*(†)*
High score	76.7*	69.4	2.1	2.0

Table 25—Among 1989–90 beginning students who indicated plans to attain a vocational certificate, associate's, or bachelor's degree, the percentage who were enrolled in or had attained a degree within five years, and the percentage after taking into account the covariation of the variables in the table: 1989–94—Continued

	Unadjusted percentage[1]	Adjusted percentage[2]	WLS coefficient[3]	Standard error[4]
Socioeconomic status				
Bottom 25%	49.1*	60.2	-5.1	2.8
Middle 50%	*62.7*	*65.3*	*(†)*	*(†)*
Top 25%	74.5*	67.8	2.4	2.0

*$p \leq .05$.

(†) Not applicable for reference group.

[1]Estimates from the BPS:90/94 Data Analysis System.

[2]Percentages adjusted for differences associated with other variables in the table (see appendix B for details).

[3]Weighted least squares (WLS) coefficient (see appendix B for details). Note that the coefficients presented here were multipled by 100 in order to represent the proportional difference between each category and its base comparison group.

[4]Standard error of WLS coefficient, adjusted for design effect (see appendix B for details).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

The initial finding that first-generation students were less likely than non-first-generation students to persist and attain a degree (57 percent compared with 73 percent), held even when controlling for the variation of other variables (62 percent versus 69 percent, adjusted). This finding suggests that first-generation status, independent of other background and enrollment factors with which it is correlated, has an effect on the likelihood of persistence and attainment.

Aside from the impact of first-generation status, the model also revealed some other findings related to student background characteristics. After controlling for the variation of other variables, it was found that first enrolling in postsecondary education at the age of 19 or older was negatively associated with persistence and attainment, compared with being 18 or younger (61 percent for those aged 19–24 and 62 percent for those aged 25 or older versus 69 percent for those aged 18 or younger, adjusted). Compared with being female, being male was also negatively associated with persistence and attainment (64 percent versus 67 percent, adjusted). In addition, when examining the relationships between race–ethnicity and persistence, an initial negative association between being black, non-Hispanic and persistence and attainment, compared with being white, non-Hispanic, also held when all other variables were controlled for (57 percent versus 65 percent, adjusted). A positive association between being Asian-Pacific Islander and persistence and attainment, compared with being white, non-Hispanic, remained after taking into account the covariation of the other variables (76 percent versus 65 percent, adjusted).

An analysis of the relationship between institution type and the likelihood of persistence and attainment revealed that the initial negative association between being initially enrolled in a public 2-year institution, compared with being enrolled in a 4-year institution, also held when all other variables were controlled for (60 percent versus 70 percent, adjusted). However, first attending other types of less than 4-year institutions did not appear to have an effect on persistence and attainment, compared with attending a public or private, not-for-profit 4-year institution, after adjustment.

Particular levels of academic and social integration appeared to affect persistence and attainment. For example, the initial difference between low scores on academic integration and persistence and attainment, compared with moderate scores (51 percent versus 68 percent, unadjusted), remained (60 percent versus 67 percent, adjusted). Likewise, an initial negative relationship between low scores in social integration measures and persistence and attainment, compared with moderate scores, also held (59 percent versus 67 percent, adjusted) after controlling for the covariation of the other variables. On the other hand, although there initially appeared to be a positive relationship between high academic or social integration scores and persistence and attainment, after controlling for the covariation of the other variables, there was no evidence that high academic or social integration scores affected persistence and attainment relative to moderate scores.[26]

Finally, after controlling for all other factors, SES and persistence and attainment were not significantly related. Thus, it appears that SES alone does not have an effect on persistence and attainment, but may also be related to a number of other characteristics (including first-generation status, 2-year public institution attendance, and part-time attendance), which in turn negatively affect persistence and attainment.

[26]The results of the regression model did not change for the other variables when the academic and social integration variables were removed from the model (BPS:90/94 DAS).

Summary

This report describes the characteristics and experiences of first-generation college students—i.e., those whose parents' highest level of education is a high school diploma or less. Many of the findings from this study were consistent with previous research about first-generation college students. In particular, this study revealed that first-generation college students had particular demographic and enrollment characteristics that distinguished them from their non-first-generation peers. They were more likely than their counterparts to be female, older, and independent. In addition, first-generation students were more likely than non-first-generation students to have dependents and lower incomes, and to be enrolled in 2-year institutions. While enrolled, they were more likely than their counterparts to be enrolled part time, receiving some form of financial aid, and working full time. Consistent with their lower incomes and increased likelihood of having dependents, first-generation students were more likely than non-first-generation students to indicate that in selecting an institution they were influenced by the availability of financial aid, the opportunity to finish coursework more quickly, being able to live at home while attending school, and being able to work at the school while enrolled.

First-generation students were more likely than non-first-generation students to value improving their financial and professional status, which may reflect qualities such as their lower socioeconomic status and parental educational attainment. This study reveals that those first-generation students who completed degree programs appeared to achieve this goal. Five years after beginning postsecondary education, first-generation students who had attained certificates or degrees were employed in similar positions and earned comparable salaries to those of their counterparts whose parents had attended college. At the same time, however, first-generation students were less likely to complete their postsecondary education within 5 years. Compared with their non-first-generation counterparts, they were more likely to be enrolled part-time, attend public 2-year institutions rather than 4-year institutions, and have lower index scores on levels of academic and social integration, all of which were negatively associated with persistence and attainment after controlling for covariation of related variables.[27]

[27]As described in this report's earlier discussion about academic and social integration, little research has been conducted on the applicability of academic and social integration models to younger, more traditional, and older, less traditional, students. It should be kept in mind that the behaviors measured in academic and social integration may be more accessible and appealing to younger students, who are less likely to be first-generation. One study conducted at a small urban community college found that

Finally, even when demographic, enrollment, and institutional characteristics, as well as levels of academic and social integration, were controlled for in the multivariate analysis, first-generation students were less likely to persist in postsecondary education than their counterparts whose parents had obtained more education. This finding highlights the salience of first-generation status even beyond its association with other factors likely to reduce persistence.

integration did not play as strong a role in affecting the persistence of older students as that of younger students. J. Grosset, "Patterns of Integration, Commitment, and Student Characteristics among Younger and Older Students," *Research in Higher Education*, 32 (2), (1991): 159–178.

Appendix A—Glossary

This glossary describes the variables used in this report. The variables were taken directly from the NCES BPS:90/94 and the B&B:93/94 Data Analysis Systems (DAS), which are NCES software applications that generate tables from the BPS:90/94 and the B&B:93/94 data. A description of the DAS software can be found in appendix B. The variable labels below are in bold, capital letters and correspond to the names of the variables in the DAS.

The glossary is organized into two sections: variable definitions for the BPS:90/94 and the B&B:93/94 data sets, respectively. In the index below, the variables in each section are listed in the order they appear in the report; the glossary is in alphabetical order in each section by variable name (displayed in the right-hand column).

Glossary Index

BPS:90/94

Student Characteristics

Gender ..... H_GENDR
Age AGE8990
Race–ethnicity ..... BPSRACE
Marital status MAR8990
Dependency for financial aid DEPEND2
Local residence ..... LOCALRES
First-generation status (highest education level attained by either parent) ..... RPARED
Socioeconomic status percentile ..... SESPERC

Future Aspirations—Related Variables

Influence the political structure ..... POLSTRUC
Become successful in own business ..... OWNBUSIN
Be successful in line of work ..... SUCCESS
Be able to find steady work ..... FINDWORK
Being very well off financially ..... WELLOFF
Become authority in given field ..... BECMAUTH
Be a leader in my community ..... LEADCOMM
Get away from this area of country ..... GETAWAY
Give own children a better opportunity ..... GIVEKIDS
Have children ..... HAVEKIDS
Have leisure time to enjoy own interests ..... LEISURE
Live close to parents and relatives ..... LIVCLOSE

Institutional Choice—Related Variables

Obtained financial aid needed ..... FINAID
Other living costs were less ..... COSTLIVE
Could finish in shorter time ..... SHORTER
Tuition and other expenses were less ..... TUITLESS
School is close to home ..... SCHCLOSE
School was far away from home ..... FARAWAY
Could live at home ..... LIVEHOME
Can go to school and work ..... SCHLNWRK
Good reputation for placing graduates ..... PLACEMNT
Offered courses of study wanted ..... COURSOFF
School has good reputation ..... GD_REP
Better chance to get job at school ..... BETTRJOB

Enrollment Characteristics

Attendance status ATST8990
Type of institution OFCO8990
Delayed entry after high school ..... DELAYED
Degree program ..... PROGTYP
Transfer status through first degree ..... TRANSFER
Employment/enrollment status EMWK8990

Academic and Social Characteristics

Composite SAT score ..... SATTOTAL
Number of and types of remedial courses received ..... REMEDIAL
Index of academic integration ACAD8990
Index of social integration SOCL8990

Persistence and Attainment Characteristics

Educational aspirations ..... ASPIRE
Persistence and attainment status ..... PERSIST
First degree attained during postsecondary education DEGREE1
Degree working toward GOAL8990

Highest degree obtained by spring 1994.... DEGALL2

Employment and Post-Baccalaureate Enrollment Characteristics

April 1994 unemployment indicator UNEM9404
Whether job different from education and training..... RJJDIFTR
Whether could have obtained job without education..... RJJWOTED
Primary occupation 1993..... OCCUP93
Respondent earned income 1993 ..... SG93EAIN
Employed in April 1994..... M_MNTH51

Financial Aid Variables

Received financial aid..... AID8990
Received grant or scholarship..... GRSCHL89
Received non-family loan NFLOAN89
Received other aid OTHR89

B&B:93/94 (follows BPS Glossary)

Student Characteristics

First-generation status (highest education level attained by either parent)..... PAREDUC
Gender ..... H_GENDER

Employment and Post-Baccalaureate Enrollment Characteristics

Annual salary ..... APRANSAL
Taken courses since graduation ..... PBACHED
Any unemployment since graduation..... UNEMPPRD
April job required college degree ..... AJOBDEGR
Program enrolled in at post-baccalaureate school PBO1PROG
April 1994 occupation ..... AJOBOCC
Employment status April 1994..... EMPLOY22
Relationship between April job and degree..... AJOBRELT

BPS:90/94

Index of academic integration **ACAD8990**

Average academic integration score at the 1989–90 postsecondary institution. Students were asked to report how often they did each of the following during the 1989–90 term: attend career-related lectures (ATLECTUR), participate in study groups with other students (STUDYGRP), talk over academic matters with faculty (TALKFAC), and meet with advisor concerning academic plans (TALKADV1). Scores included never (1), once (2), sometimes (3), and often (4). A mean of the scores of the four variables was calculated to compose the academic integration score. In order to compute mean scores with decimals to the hundredth place in the DAS, the scores were multiplied by 100. Then the scores were classified into low, moderate, and high as described below:

Low score	Academic integration score fell at or below the lowest 25th percentile (0–191.49).
Moderate score	Academic integration score fell between the 25th and the 75th percentiles (191.5–291.49).
High score	Academic integration score fell at or above the 75th percentile (291.5–400).

Age **AGE8990**

Age when first enrolled at 1989–90 postsecondary institution. Age was defined in the following categories:

18 years or younger
19–24 years
25 years or older

Received financial aid **AID8990**

Indicates whether student received any financial aid in 1989–90. It was estimated from the student's responses to NPSAS:90 variables TOTAID and OTHSCAMT and aggregated to the following categories:

No aid
Received aid

Educational aspirations **ASPIRE**

Highest level of education that student expected to complete when questioned in 1989–90. Student response to the question "Realistically, what is the highest level of education you ever expect to complete?" This variable aggregates a variety of responses into the following categories:

Trade school	Includes completing less than 1 year of occupational/trade/technical/business school; 1 but less than 2 years of occupational/trade/technical/business school; 2 years or more of occupational/trade/technical/business school.
2-year degree	Includes completing less than 2 years of college, 2 or more years of college.
Bachelor's degree	Includes completing a bachelor's degree (4- or 5-year degree).
Advanced degree	Includes completing master's degree or equivalent; M.D./D.D.S./L.L.B. or other advanced professional degree; doctorate degree (e.g. Ph.D., Ed.D., D.B.A.)

Attendance status **ATST8990**

Percentage of months attended postsecondary institution full time during the 1989–90 school year. Based on monthly enrollment and full-time/part-time status during the academic year.

Part-time	Student attended the 1989–90 postsecondary institution full time for less than 50 percent of the months during that year.
More than part-time	Student attended the 1989–90 postsecondary institution full time for more than 50 percent of the months during that year.

Become authority in given field **BECMAUTH**

Student response to the question "As I read the following statements, please tell me the importance of the statement to you personally: becoming an authority in your field (BECMAUTH), influencing the political structure (POLSTRUC), being very well off financially (WELLOFF), becoming successful in a business of your own (OWNBUSIN), being successful in your line of work (SUCCESS), being able to find steady work (FINDWORK), being a leader in your community (LEADCOMM), living close to parents and relatives (LIVCLOSE), getting away from the area of the country where you grew up (GETAWAY), having leisure time to enjoy your own interests (LEISURE), having children (HAVEKIDS), being able to give your children better opportunities than you've had (GIVEKIDS)."

The responses were categorized as follows: very important, somewhat important, and not important. The percentage of students who reported the above listed items as very important was used in this analysis.

Better chance to get job at school **BETTRJOB**

Student response to the question "Please tell me if [the following reason] was very important, somewhat important, or not important in deciding upon the school you attended in the [fall of 1990]: the school had a good reputation (GD_REP), you obtained the financial aid you needed at the school (FINAID), the school offered the course of study you wanted (COURSOFF), ... you had a better chance to get a job at the school (BETTRJOB), your tuition and other direct school expenses were less at the school than at other schools (TUITLESS), your other living costs were less than at other schools (COSTLIVE)... the school was close to your home (SCHCLOSE), you could work while attending the school (SCHLNWRK), you could live at home (LIVEHOME), the school was far away from your home (FARAWAY), the school had a good reputation for placing its graduates (PLACEMNT), you could finish the course in a short period of time (SHORTER)."

The responses were categorized as follows: very important, somewhat important, and not important. The percentage of students who reported the above listed items as very important was used in this analysis.

Race–ethnicity **BPSRACE**

This variable was created by combining two items in which respondents reported their race and whether or not they were of Hispanic origin.

White, non-Hispanic	A person having origins in any of the original peoples of Europe, North Africa, or the Middle East (except those of Hispanic origin).
Black, non-Hispanic	A person having origins in any of the black racial groups of Africa, not of Hispanic origin.
Hispanic	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
Asian/Pacific Islander	A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or Pacific Islands. This includes people from China, Japan, Korea, the Philippine Islands, Samoa, India, and Vietnam.
American Indian/Alaskan Native	A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.

Other living costs were less **COSTLIVE**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: other living costs at the school were less than at other schools. For a more detailed discussion of this variable, see BETTRJOB.

Offered course of study wanted **COURSOFF**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: the school offered the course of study he/she wanted. For a more detailed discussion of this variable, see BETTRJOB.

Highest degree obtained by spring 1994 **DEGALL2**

From 1994 student interview. This variable includes those with incomplete or minimal enrollment data.

None	Respondent had not earned a credential by spring 1994.
Certificate	Respondent's highest degree attained by spring 1994 was a vocational/technical certificate.
Associate's degree	Respondent's highest degree attained by spring 1994 was an associate's degree.
Bachelor's degree	Respondent's highest degree attained by spring 1994 was a bachelor's degree.

First degree attained during postsecondary education **DEGREE1**

First degree attained during postsecondary education. The categories include:

None	Student did not attain any degrees during postsecondary education.
Certificate	Student attained a certificate or other formal award during postsecondary education.
Associate's degree	Student attained an associate's degree during postsecondary education.
Bachelor's degree	Student attained a bachelor's degree during postsecondary education.

Delayed entry after high school **DELAYED**

Timing of entry into postsecondary education following high school. The variable determines entry into postsecondary education relative to the type of high school credential the student obtained.

Did not delay	Student did not delay entry into postsecondary education.
Delayed, high school diploma	Student delayed entry after earning a regular high school diploma.
Delayed, no high school diploma	Student delayed entry and did not hold a regular high school diploma before entry or held a GED.

Dependency for financial aid **DEPEND2**

Categorizes independent students into those with and those without dependents, which are categories that determine the type of need analysis formula used in determining financial aid eligibility. Based on dependency status, marital status, and family size.

Dependent
Independent, no dependents
Independent with dependents

Employment/enrollment status **EMWK8990**

Full-time or part-time enrollment status during month began at 1989–90 postsecondary institution. Working full time was defined as working 34 or more hours per week. All respondents who worked at some time while enrolled and who considered themselves primarily employees between 1990 and 1994 were coded as working full time while enrolled on the EMWK variable.

Did not work full time while enrolled	Student worked less than 34 hours per week.
Worked full time while enrolled	Student worked 34 or more hours per week.

School was far away from home **FARAWAY**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: the school was far away from home. For a more detailed discussion of this variable, see BETTRJOB.

Obtained financial aid needed **FINAID**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: obtained the financial aid needed at the school. For a more detailed discussion of this variable, see BETTRJOB.

Be able to find steady work **FINDWORK**

Indicates percentage of students who reported the following as very important to him/her personally: being able to find steady work. For a more detailed discussion of this variable, see BECMAUTH.

School has good reputation **GD_REP**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: the school had a good reputation. For a more detailed discussion of this variable, see BETTRJOB.

Get away from this area of country **GETAWAY**

Indicates percentage of students who reported the following as very important to him/her personally: getting away from the area of the country in which the student grew up. For a more detailed discussion of this variable, see BECMAUTH.

Give own children better opportunity **GIVEKIDS**

Indicates percentage of students who reported the following as very important to him/her personally: being able to give his/her children better opportunities than he/she has had. For complete discussion, see BECMAUTH.

Degree working toward **GOAL8990**

Type of degree student was working toward at 1989–90 postsecondary institution. The categories include:

None	Student did not report working toward any formal degree.
Vocational certificate / license	Student reported working toward a certificate or formal award other than an associate's or bachelor's degree.
Associate's degree	Student reported working toward an associate's degree.
Bachelor's degree	Student reported working toward a bachelor's degree.

Received grant or scholarship **GRSCHL89**

Indicates whether student received grant or scholarship in 1989–90.

No grant or scholarship	Student did not receive grant or scholarship in 1989–90.
Grant or scholarship	Student received grant or scholarship in 1989–90.

Have children **HAVEKIDS**

Indicates percentage of students who reported the following as very important to him/her personally: having children. For a more detailed discussion of this variable, see BECMAUTH.

Gender **H_GENDR**

Student response to the question "Are you male or female?"

Be a leader in my community **LEADCOMM**

Indicates percentage of students who reported the following as very important to him/her personally: being a leader in his/her community. For a more detailed discussion of this variable, see BECMAUTH.

Have leisure time to enjoy own interests **LEISURE**

Indicates percentage of students who reported the following as very important to him/her personally: having leisure time to enjoy his/her interests. For a more detailed discussion of this variable, see BECMAUTH.

Live close to parents and relatives **LIVCLOSE**

Indicates percentage of students who reported the following as very important to him/her personally: living close to parents and relatives. For a more detailed discussion of this variable, see BECMAUTH.

Could live at home **LIVEHOME**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: could live at home. For a more detailed discussion of this variable, see BETTRJOB.

Local residence **LOCALRES**

Student's residence during 1989–90 school term.

Campus housing	Student lived in on-campus residential housing.
Off-campus	Student did not live in on-campus residential housing.
With parents or other relatives	Student lived with parents or other relatives.

Employed in April 1994 **M_MNTH51**

Respondent's employment and enrollment status as of April 1994. Includes the following categories:

Not employed and not enrolled
Enrolled and not employed
Employed and not enrolled
Employed and enrolled

In this report, the last two categories were combined to indicate employment status as of 1994.

Marital status **MAR8990**

Marital status during academic year 1989–90.

Not married	This category includes respondents who are single, never married; living as married, never married; divorced; widowed; and living as married, previously divorced.
Married	This category includes currently married respondents.
Separated	This category includes currently separated respondents.

Received non-family loan **NFLOAN89**

Indicates whether student received non-family loan in 1989–90.

Received loan	Student received non-family loans in 1989–90.
Did not receive loan	Student did not receive non-family loans in 1989–90.

Primary occupation 1993 **OCCUP93**

Occupational category of principal job in 1993.

Clerical (1)
Craftsman/repair/laborer/machinist (2,3,5)
Manager/administrator (4)
Professional (6)
Sales (7)
Services (8)
Technical (9)
Other (10)

Type of institution **OFCO8990**

Level and control of 1989–90 postsecondary institution

Public 4-year	A postsecondary education institution that is supported primarily by public funds and operated by publicly elected or appointed officials who control the programs and activities and can award bachelor's degrees or higher, including institutions that award doctorate degrees and first-professional degrees. These degrees include chiropractic, pharmacy, dentistry,

	podiatry, medicine, veterinary medicine, optometry, law, osteopathic medicine, and theology.
Private, not-for-profit 4-year	A postsecondary institution that is controlled by an independent governing board and incorporated under Section 501(c)(3) of the Internal Revenue Code and can award bachelor's degrees or higher, including institutions that award doctorate degrees and first-professional degrees. These degrees include chiropractic, pharmacy, dentistry, podiatry, medicine, veterinary medicine, optometry, law, osteopathic medicine, and theology.
Public 2-year	A postsecondary education institution that is supported primarily by public funds and operated by publicly elected or appointed officials who control the programs and activities and that does not confer bachelor's degrees, but does provide 2-year programs that result in a certificate or an associate's degree, or 2-year programs that fulfill part of the requirements for a bachelor's degree or higher at 4-year institutions.
Private, for-profit	A postsecondary institution that is privately owned and operated as a profit-making enterprise. Includes career colleges and proprietary institutions. Level and control can be private, not-for-profit 4-year; private, not-for-profit 2-year; or private, not-for-profit less-than-2-year.
Other less-than-2-year	A postsecondary institution in which at least one of the programs offered at the institution is 3 months or longer, and produces a terminal award or certificate. In addition, no program at the institution lasts longer than 2 years. The level and control can be private, not-for-profit 2-year; public less-than-2-year; and private, not-for-profit less-than-2-year institutions.

Received other aid **OTHR89**

Indicates whether student received other aid in 1989–90.

Yes	Student received other aid in 1989–90.
No	Student did not receive other aid in 1989–90.

Become successful in own business **OWNBUSIN**

Indicates percentage of students who reported the following as very important to him/her personally: becoming successful in a business of his/her own. For a more detailed discussion of this variable, see BECMAUTH.

Persistence and attainment status **PERSIST**

This dichotomous variable identifies students' persistence and attainment by coding them as persisted—attained by or enrolled in 1994 (1) or not persisted—not attained by or enrolled in 1994 (0). The overall persistence and attainment outcomes were derived by categorizing the students' persistence paths from initial enrollment at the NPSAS institution until follow-up in spring 1994. This variable coded another variable describing student's persistence and attainment toward first degree (if any) or last enrollment (PERACUM) to identify students who had attained or were still enrolled. Those who persisted included the following groups : 1, 2, 3, 4, 7, 8, 9, and 10. Those who did not persist included the following groups: 5, 6, 11, and 12.

1. Internal persister attained
2. Internal persister
3. Internal non-continuous—attained
4. Internal non-continuous—still enrolled
5. Internal non-continuous—not enrolled
6. Internal left without return
7. Transfer persister attained
8. Transfer persister
9. Transfer non-continuous—attained
10. Transfer non-continuous—still enrolled
11. Transfer non-continuous—not enrolled
12. Transfer left without return

Good reputation for placing graduates **PLACEMNT**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: the school had a good reputation for placing its graduates. For a more detailed discussion of this variable, see BETTRJOB.

Influence the political structure **POLSTRUC**

Indicates percentage of students who reported the following as very important to him/her personally: influencing the political structure. For a more detailed discussion of this variable, see BECMAUTH.

Degree program **PROGTYP**

Type of degree program student was enrolled in in 1989–90.

Associate's degree
Bachelor's degree
Undergraduate certificate
Other undergraduate

Number of and types of remedial instruction received **REMEDIAL**

Number of and types of remedial instruction received as indicated by student in 1989–90. Based on remedial math (REMMATH), remedial reading (REMREAD), remedial study skills (REMSTSK), remedial writing (REMWRITE). The categories were defined as follows:

None
One or more

Whether job different from education and training **RJJDIFTR**

Indicates whether the student's most recent (1993) job was different from education and training he/she received in postsecondary education. This variable was recoded from the variable SCJDIFTR.

No	The student's job related to his/her education.
Yes	The student's job did not relate to his/her education.

Whether could have obtained job without education **RJJWOTED**

Indicates whether student could have gotten most recent (1993) job without the education and training he/she received in postsecondary education. This variable was recoded from the variable SCJWOTED.

No	The student could not have gotten job without education.
Yes	The student could have gotten job without education.

First-generation status (highest education level attained by either parent) **RPARED**

Maximum of either father's and/or mother's education. For this analysis, this variable was used to indicate first-generation status.

First-generation students included those whose parents had:
- Less than high school education
- High school diploma

Non-first-generation students were subdivided into those whose parents had some college:
- Trade school
- Less than 2 years of college
- 2 or more years of college

and those whose parents had earned a bachelor's or advanced degree:
- Bachelor's degree
- Postgraduate/professional degree

Composite SAT score **SATTOTAL**

Student's combined SAT score. Score ranges included:

Less than 600
600–799
800–999
1000–1199
1200–1399
1400 or more

School is close to home **SCHCLOSE**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: the school was close to student's home. For a more detailed discussion of this variable, see BETTRJOB.

Can go to school and work **SCHLNWRK**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: could work while attending the school. For a more detailed discussion of this variable, see BETTRJOB.

Socioeconomic status percentile **SESPERC**

Composite variable combining parents' occupation (father/mother), dependents' family income, and the existence of a series of material possessions in the respondent's home.

Lowest quartile	Socioeconomic status fell at or below the 25th percentile.
Middle quartiles	Socioeconomic status fell between the 25th percentile and the 75th percentile.
Highest quartile	Socioeconomic status fell at or above the 75th percentile.

Respondent earned income 1993 **SG93EAIN**

Student response to the question "How much of [your 1993 personal total gross income] was earned?

Could finish in shorter time **SHORTER**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: could finish the course in a short period of time. For a more detailed discussion of this variable, see BETTRJOB.

Index of social integration **SOCL8990**

Average social integration score at the 1989–90 postsecondary institution. Students were asked how often they did each of the following during the 1989–90 term: had contact with faculty outside of class, go to places with friends from school, go to school assistance centers, and participate in school clubs. Scores included never (1), once (2), sometimes (3), and often (4). A mean of the scores of the four variables was calculated to compose the social integration score. In order to compute mean scores with decimals to the hundredth place in the DAS, the scores were multiplied by 100. Then the scores were classified into low, moderate, and high as described below:

Low score	Social integration score fell at or below the lowest 25th percentile (0–172.49).
Moderate score	Social integration score fell between the 25th and the 75th percentiles (172.5–272.49).
High score	Social integration score fell at or above the 75th percentile (272.5–400).

Be successful in line of work **SUCCESS**

Indicates percentage of students who reported the following as very important to him/her personally: being successful in line of his/her work. For a detailed discussion of the variable, see BECMAUTH.

Transfer status through first degree **TRANSFER**

Indicates whether student ever transferred during period before attainment of first degree.

Did not transfer
Transferred

Tuition and other expenses were less **TUITLESS**

Indicates percentage of students who reported the following as very important in his/her decision in choosing an institution: tuition and other direct school expenses were less at the school than at other schools. For complete discussion, see BETTRJOB.

April 1994 unemployment indicator **UNEM9404**

Variable indicates student's unemployment status in April 1994.

Not unemployed in April 1994
Unemployed in April 1994

Being very well off financially **WELLOFF**

Indicates percentage of students who reported the following as very important to him/her personally: being very well off financially. For a more detailed discussion of this variable, see BECMAUTH.

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Annual salary **APRANSAL**

This variable was constructed by annualizing the wages/salary reported by respondents for their primary April 1994 job. If a respondent had more than one job, the primary job was the one with the most hours worked; if the number of hours was equal, the job with the highest salary was selected. APRANSAL was computed by multiplying the sum of the wages reported per pay period by the number of pay periods within a year.

This variable was also used to compute average salaries. When this variable was used in table columns, the table included only those whose annual salary was at least $1,000 and less than or equal to $500,000.

April job required college degree **AJOBDEGR**

Respondents were asked whether or not a bachelor's degree was required to obtain their April job.

Yes
No

April 1994 occupation **AJOBOCC**

Occupation code for respondents' primary (see APRANSAL for definition) April job. The occupation was coded during the interview with an on-line coding program developed by NCES. This report aggregated the coded occupations as follows (the numbers in parentheses are the codes from the on-line coding program):

Clerical

- Secretarial (01)
  - Includes typists, receptionists, computer/machine operators, payroll/time-keepers, shipping/receiving clerks, and stenographers.
- Financial clerical (02)
  - Includes bookkeepers, bank tellers, billing clerks, cashiers, bill collectors, real estate appraisers, and insurance adjusters.
- Other clerical (03)
  - Includes ticket/travel agents, mail carriers/handlers, postal clerks, messengers, meter readers, enumerators, interviewers, dispatchers, library assistants, teacher aides, and stock clerks.

Craftsman/laborer

- Crafts, precision production/repair (04)
  - Includes bakers, mechanics, painters, carpenters, jewelers, machinists, repairers, excavators, inspectors, electricians, millers, sign painters, tailors, telephone lineworkers, upholsterers, opticians, plasterers, paper hangers, and plumbers.
- Agriculture, fishing (05)
  - Includes farmers, horticulturists, gardeners/groundskeepers, trappers, foremen, and fish farmers.
- Homemaker (06)
- Laborer (07)
  - Includes apprentices, construction workers, sanitation workers, longshoremen, stevedores, teamsters, vehicle washers, miscellaneous laborers, freight/material handlers, and carpenter's helpers.

Manager

Manager/administrator, sales/purchasing (8)
Includes sales managers, buyers, advertising agents, insurance brokers, and underwriters.
Manager/administrator, government (9)
Includes local, state, and federal government managers, supervisors, administrators, treasurers, assessors, controllers, inspectors, and school administrators and principals.
Manager/administrator, retail/hospitality (10)
Stores, hotels, restaurants, bars, or other retail establishments.
Manager/administrator, manufacturing/construction (11)
Quality control and line supervisors.
Manager/administrator, other (12)

Professional

Arts and entertainment occupations (15)
Includes actors, artists, writers, athletes, dancers, designers, editors, reporters, musicians, composers, photographers, public relations, radio/television announcers, and other entertainers.
Medical, nonphysician (16)
Includes registered nurses, therapists, pharmacists, dietitians, and clinical psychologists.
All professional engineers (17)
Includes mechanical, electrical, agricultural, aeronautical, chemical, mining, materials, and petroleum.
Physician (18)
Includes physicians, dentists, veterinarians, optometrists, chiropractors, and podiatrists.
Legal professions (lawyer, judge) (19)
All other professions (20)
Includes clergy, social workers, professors, scientists, architects, librarians, and accountants.
Proprietor/owner, retail/hospitality (21)
Proprietor/owner, manufacturing/construction (22)
Proprietor/owner, other (23)

Sales
Sales (25)
Includes all sales positions, advertisers, auctioneers, insurance agents, real estate agents, and brokers.

Service
Protective services (24)
Elementary/secondary school teacher (26)
Includes substitute and pre-school teachers.
Service (27)
Includes domestics, barbers, janitors, waiters/waitresses, attendants, nursing aides, baggage porters, bellhops, orderlies, house-keepers, hairdressers, paper carriers, child care workers, launderers, bootblacks, and lifeguards.

Technical

Skilled operative, machinery/equipment (14)
Includes assemblers, drivers, machine operators, cutters, graders, meat cutters, sailors, fire fighters, welders, textile carders/loopers/knitters, stitchers/sewers, riveters, punchers, mine operatives, and bottlers.

Computer science, programming (28)

Includes computer technicians, systems analysts/specialists, and computer engineering assistants.

Noncomputer science technician (29)

Includes drafters, medical/dental technicians, hygienists, pilots, radiology technicians, clinical lab technician, and engineering assistants.

Other

Military personnel (13)

Other (uncodeable) (0)

Relationship between April job and degree **AJOBRELT**

Indicates how closely related respondents' primary April 1994 job was to their field of study. See entry for APRANSAL for definition of "primary job." Three options were offered: closely related; somewhat related; and not at all related.

Employment status April 1994 **EMPLOY22**

Indicates employment status in April 1994. Respondents were asked to provide information for all their jobs since graduating from college, including the beginning and ending dates, whether they were employed full or part time in each job, if they had been looking for work (and if so, if they received unemployment benefits), and if they were not working, the reason. Based on these dates, monthly indicators were constructed characterizing the employment status of each respondent as: employed full time; employed part time; unemployed with benefits; unemployed without benefits; and out of the labor force.

A job was considered full time if respondent reported working 35 or more hours. For respondents with more than one job, the status variable characterizes the job they reported as their primary employment, i.e., the job they worked the most hours. Thus, if they were employed in a full-time job and a part-time job, they were coded as full time. If they worked two or more part-time jobs, they were coded as part time even if their hours totaled 35 or more per week.

Respondents who were not working but looking for work were considered unemployed. For this report, the unemployment categories (with and without benefits) were combined because almost no respondents were receiving unemployment benefits. Respondents categorized as out of the labor force were those who were not available for work and not looking for work.

Employed	Includes full-time and part-time employed respondents.
Not employed	Includes unemployed respondents who are either receiving or not receiving benefits and respondents out of the labor force.

Gender of student **H_GENDER**

Indicates the gender of the student. Students were asked their gender only if this information was missing from NPSAS and not obvious during the interview. Respondents were categorized as male or female.

First-generation status (highest education level attained by either parent) **PAREDUC**

Maximum of either father's and/or mother's education. For this analysis, this variable was used to indicate first-generation status.

First-generation students' parents had:
- Less than a high school diploma
- GED
- High school diploma

Non-first-generation students were subdivided into those whose parents had some college experience, including:
- Less than 1 year of college
- 1 year but less than 2 years of college
- 2 years or more of college (but no bachelor's degree)
- Associate's degree

and those whose parents had earned a bachelor's or advanced degree:
- Bachelor's degree (4–5 year degree)
- Master's degree or equivalent
- First-professional degree
- Other advanced professional degree
- Doctorate (Ph.D., Ed.D.)

Taken courses since graduation **PBACHED**

Indicates graduate student enrollment status. Student response to the question "Have you taken any courses, for credit, offered by a college, university, technical or vocational school, since graduating from [the postsecondary institution where you attained your degree]?"

No	Has not taken any graduate courses for credit.
Yes	Has taken graduate courses for credit.

Program enrolled in at post-baccalaureate school **PBO1PROG**

Asked of all respondents. Indicates graduate program enrolled in. The categories include:

- Non-degree
- Post-baccalaureate certificate
- Master's degrees (M.A., M.S., M.B.A.)
- Doctoral degrees (Ph.D., Ed.D., D.P.H.)
- First-professional degree
- Other

Any unemployment since graduation **UNEMPPRD**

Indicates whether bachelor's degree recipient had any unemployment spells since graduation.

Appendix B—Technical Notes and Methodology

Beginning Postsecondary Students Longitudinal Study

The Beginning Postsecondary Students Longitudinal Study (BPS:90/94) followed students from the NPSAS:90 sample who were identified as first-time beginning (FTB) students in academic year 1989–90. A CATI (Computer-Assisted Telephone Interview) was conducted with these students 2 and 4 years after the base year. The CATI system provided interviewers with screens of questions to be asked of the respondents, with the software guiding the interviewer and respondent through the interview, automatically skipping inapplicable questions based on prior response patterns or suggesting appropriate wording for probes should a respondent pause or seem uncertain in answering a question. This particular CATI collected information concerning enrollment, program completion, education financing, employment, and family formation; graduate school access and enrollment; and civic participation. The data derived from this survey permit a variety of analyses concerning postsecondary persistence and completion, entry into the work force, and civic participation.

Unlike other NCES longitudinal surveys based on grade-specific cohorts (such as High School and Beyond), the BPS design allows for the increasing numbers of "nontraditional" postsecondary students, such as those who have delayed their education due to financial needs or family responsibilities. Students who began their postsecondary studies before 1989–90, stopped out, and then returned to their studies in 1989–90 were not included, nor were students who were still enrolled in high school.

The BPS survey sample, while representative and statistically accurate, is also not a simple random sample. Instead, the samples are selected using a more complex three-step procedure with stratified samples and differential probabilities of selection at each level. First, postsecondary institutions were initially selected within geographic strata. Once institutions were organized by zip code and state, they were further stratified by control (i.e., public; private, not-for-profit; or private, for-profit) and degree offering (less-than-2-year, 2-year to 3-year, 4-year nondoctorate-granting, and 4-year doctorate-granting).

For more information on BPS:90/94, consult *Beginning Postsecondary Students Longitudinal Study Second Follow-up (BPS:90/94) Final Technical Report* (Washington, D.C.: U.S. Department of Education, National Center for Education Statistics, NCES 96-153).

Baccalaureate and Beyond Longitudinal Study

The Baccalaureate and Beyond Longitudinal Study (B&B:93) tracks the experiences of a cohort of college graduates who received a bachelor's degree during the 1992–93 academic year. This group's experience in the areas of further education and degree completion, employment, public service, family formation, and other adult decisions will be followed for 12 years. B&B will provide data to assess the outcomes of postsecondary education, including graduate and professional program access, labor market experience, and rate of return on investment in education.

Participants in the 1993 National Postsecondary Student Aid Study (NPSAS:93) who received their bachelor's degree between July 1992 and June 1993 form the base sample for the B&B study. Approximately 12,500 NPSAS:93 respondents were identified as eligible for the first followup survey, which was conducted between July 1993 and December 1994 (roughly one year after participants' graduation). Approximately 1,500 members of this initial sample were determined to be ineligible at the time of the followup interview, and about 900 others were not interviewed (usually because they could not be located or refused to participate), generating a final sample of 10,080 college graduates. An overall response rate of 92 percent was achieved for the first follow-up survey.

The B&B survey sample, while representative and statistically accurate, was not a simple random sample. Instead, the survey sample was selected using a more complex three-step procedure with stratified samples and differential probabilities of selection at each level. The same three-stage procedure described for BPS applies to B&B.

For information on procedures for the Baccalaureate and Beyond First Followup Study (B&B:93/94), consult the *Baccalaureate and Beyond Longitudinal Study: 1993/94 Methodology Report* (Washington, DC: U.S. Department of Education, National Center for Educational Statistics, forthcoming).

Accuracy of Estimates

The statistics in this report are estimates derived from a sample. Two broad categories of error occur in such estimates: sampling and nonsampling errors. Sampling errors occur because

observations are made only on samples of students, not on entire populations. Nonsampling errors occur not only in sample surveys but also in complete censuses of entire populations. Nonsampling errors can be attributed to a number of sources: inability to obtain complete information about all students in all institutions in the sample (some students or institutions refused to participate, or students participated but answered only certain items); ambiguous definitions; differences in interpreting questions; inability or unwillingness to give correct information; mistakes in recording or coding data; and other errors of collecting, processing, sampling, and imputing missing data.

Data Analysis System

The estimates presented in this report were produced using the BPS:90/94 and B&B:93/94 Data Analysis Systems (DAS). The DAS software makes it possible for users to specify and generate their own tables from the BPS and B&B data. With the DAS, users can replicate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates proper standard errors[28] and weighted sample sizes for these estimates. For example, table B1 contains standard errors that correspond to table 2 in the text, and was generated by the BPS:90/94 DAS. If the number of valid cases is too small to produce a reliable estimate (fewer than 30 cases), the DAS prints the message "low-N" instead of the estimate.

In addition to tables, the DAS will also produce a correlation matrix of selected variables to be used for linear regression models. Included in the output with the correlation matrix are the design effects (DEFTs) for each variable in the matrix. Since statistical procedures generally compute regression coefficients based on simple random sample assumptions, the standard errors must be adjusted with the design effects to take into account the BPS and B&B stratified sampling method. (See discussion under "Statistical Procedures" below for the adjustment procedure.)

The DAS can be accessed electronically at www.PEDAR-DAS.org. For more information about the BPS:90/94 and B&B:93/94 Data Analysis Systems, contact:

[28]The BPS and B&B samples are not simple random samples and, therefore, simple random sample techniques for estimating sampling error cannot be applied to these data. The DAS takes into account the complexity of the sampling procedures and calculates standard errors appropriate for such samples. The method for computing sampling errors used by the DAS involves approximating the estimator by the linear terms of a Taylor series expansion. The procedure is typically referred to as the Taylor series method.

Table B1—Standard errors for table 2: Percentage distribution (by columns) of 1989–90 beginning postsecondary students according to demographics, by first-generation status

			Not a first-generation student		
	Total	First-generation student	Total	Some college	Bachelor's or advanced degree
Gender					
Male	1.0	1.7	1.2	1.9	1.5
Female	1.0	1.7	1.2	1.9	1.5
Age in 1989–90					
18 years or younger	1.3	1.8	1.4	2.2	1.6
19–24 years	1.0	1.5	1.3	2.1	1.6
25–29 years	0.5	1.1	0.4	0.8	0.4
30 years or older	0.8	1.2	0.5	1.0	0.4
Race–ethnicity					
White, non-Hispanic	1.2	1.8	1.2	1.8	1.4
Black, non-Hispanic	0.7	1.0	0.8	1.4	0.9
Hispanic	0.7	1.3	0.6	1.1	0.7
Asian/Pacific Islander	0.5	0.7	0.6	0.7	0.8
American Indian/Alaskan Native	0.2	0.4	0.2	0.1	0.3
Marital status in 1989–90					
Not married[1]	8.9	1.5	0.7	1.4	0.7
Married	8.7	1.5	0.7	1.3	0.7
Separated	0.3	0.5	0.2	0.5	0.1
Dependency status in 1989–90					
Dependent	1.2	1.8	1.0	1.8	1.0
Independent, no dependents	0.7	1.2	0.7	1.3	0.7
Independent with dependents	0.9	1.6	0.7	1.3	0.8
Socioeconomic status					
Lowest quartile	0.8	1.4	0.6	1.2	0.5
Middle quartiles	1.0	1.6	1.3	2.0	1.5
Highest quartile	1.1	1.3	1.3	1.9	1.5
Educational aspirations					
Trade school	0.6	1.2	0.5	1.1	0.4
2-year degree	0.8	1.5	0.8	1.4	1.0
Bachelor's degree	1.1	1.6	1.4	2.1	1.6
Advanced degree	1.0	1.5	1.4	2.1	1.6
SAT total score					
Less than 600	0.9	1.7	0.9	1.3	1.2
600–799	1.6	3.3	1.7	2.6	1.8
800–999	1.9	3.0	2.1	2.9	2.5
1000–1199	1.5	2.5	1.7	2.7	2.1
1200–1399	1.4	0.9	1.8	1.3	2.2
1400 or more	0.4	0.2	0.5	0.4	0.6

[1]The category "not married" includes the following categories: single, never married; living as married, never married; divorced; widowed; and living as married, previously divorced.

NOTE: Unlike the other tables in this report, the distributions are by columns instead of rows.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:90/94), Data Analysis System.

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Statistical Procedures

Two types of statistical procedures were employed in this report: testing differences between means, and adjustment of means after controlling for covariation among a group of variables. Each procedure is described below.

Differences Between Means

The descriptive comparisons were tested in this report using Student's *t* statistic. Differences between estimates are tested against the probability of a Type I error, or significance level. The significance levels were determined by calculating the Student's *t* values for the differences between each pair of means or proportions and comparing these with published tables of significance levels for two-tailed hypothesis testing.

Student's *t* values may be computed to test the difference between estimates with the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}} \qquad (1)$$

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. This formula is valid only for independent estimates. When estimates are not independent a covariance term must be added to the formula. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

$$\frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p\ se_{sub}^2}} \qquad (2)$$

where p is the proportion of the total group contained in the subgroup.[29]

[29]U.S. Department of Education, National Center for Education Statistics, *A Note from the Chief Statistician*, No. 2, 1993.

When comparing two percentages from a distribution that adds to 100 percent, the following formula is used:

$$\frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2 - 2(r)se_1\ se_2}} \qquad (3)$$

where r is the correlation between the two estimates.[30] The estimates, standard errors, and correlations can all be obtained from the DAS.

There are hazards in reporting statistical tests for each comparison. First, comparisons based on large t statistics may appear to merit special attention. This can be misleading, since the magnitude of the t statistic is related not only to the observed differences in means or percentages but also to the number of students in the specific categories used for comparison. Hence, a small difference compared across a large number of students would produce a large t statistic.

A second hazard in reporting statistical tests for each comparison occurs when making multiple comparisons among categories of an independent variable. For example, when making paired comparisons among different levels of income, the probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison. When more than one difference between groups of related characteristics or "families" are tested for statistical significance, one must apply a standard that assures a level of significance for all of those comparisons taken together.

Comparisons were made in this report only when $p \leq .05/k$ for a particular pairwise comparison, where that comparison was one of k tests within a family. This guarantees both that the individual comparison would have $p \leq .05$ and that for k comparisons within a family of possible comparisons, the significance level for all the comparisons will sum to $p \leq .05$.[31]

For example, in a comparison of the percentages of males and females who enrolled in postsecondary education only one comparison is possible (males versus females). In this family, $k=1$, and the comparison can be evaluated without adjusting the significance level. When students are divided into five racial–ethnic groups and all possible comparisons are made, then $k=10$

[30]Ibid.

[31]The standard th[illegible]$.05/k$ for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to $p \leq .05$. For tables showing the t statistic required to ensure that $p \leq .05/k$ for a particular family size and degrees of freedo[illegible] Olive Jean Dunn, "Multiple Comparisons Among Means," *Journal of the American Statistical Association* 56 (1961): 52–6.

and the significance level of each test must be $p \leq .05/10$, or $p \leq .005$. The formula for calculating family size (k) is as follows:

$$k = \frac{j(j-1)}{2} \tag{4}$$

where j is the number of categories for the variable being tested. In the case of race–ethnicity, there are five racial–ethnic groups (American Indian, Asian/Pacific Islander, black non-Hispanic, Hispanic, and white non-Hispanic), so substituting 5 for j in equation 2,

$$k = \frac{5(5-1)}{2} = 10$$

Adjustment of Means to Control for Background Variation

Tabular results are limited by sample size when attempting to control for additional factors that may account for the variation observed between two variables. For example, when examining the percentages of those who completed a degree or were still enrolled in postsecondary education five years after their initial enrollment, it is impossible to know to what extent the observed variation is due to socioeconomic status (SES) differences and to what extent it is due to differences in other factors related to SES, such as type of institution attended, intensity of enrollment, and so on. However, if a nested table were produced showing SES within type of institution attended, within enrollment intensity, the cell sizes would be too small to identify the patterns. When the sample size becomes too small to support controls for another level of variation, one must use other methods to take such variation into account.

To overcome this difficulty, multiple linear regression was used to obtain means that were adjusted for covariation among a list of control variables. Adjusted means for subgroups were obtained by regressing the dependent variable on a set of descriptive variables such as gender, race–ethnicity, SES, etc. Substituting ones or zeros for the subgroup characteristic(s) of interest and the mean proportions for the other variables results in an estimate of the adjusted proportion for the specified subgroup, holding all other variables constant. For example, consider a hypothetical case in which two variables, age and gender, are used to describe an outcome, Y (such as attaining a degree). The variables age and gender are recoded into a dummy variable representing age, A, and a dummy variable representing gender, G:

Age	*A*
24 years or older	1
Under 24 years old	0
and	
Gender	*G*
Female	1
Male	0

The following regression equation is then estimated from the correlation matrix output from the DAS:

$$\hat{Y} = a + b_1 A + b_2 G$$

To estimate the adjusted mean for any subgroup evaluated at the mean of all other variables, one substitutes the appropriate values for that subgroup's dummy variables (1 or 0) and the mean for the dummy variable(s) representing all other subgroups. For example, suppose *Y* represents attainment, and is being described by age (*A*) and gender (*G*), coded as shown above, with means as follows:

Variable	Mean
A	0.355
G	0.521

Next, suppose the regression equation results in:

$$\hat{Y} = 0.15 + 0.17A + 0.01G$$

To estimate the adjusted value for older students, one substitutes the appropriate parameter estimates and variable values into equation 3.

Variable	Parameter	Value
a	0.15	—
A	0.17	1.000
G	0.01	0.521

This results in:

$$\hat{Y} = 0.15 + (0.17)(1) + (0.01)(0.521) = 0.325$$

In this case the adjusted mean for older students is 0.325 and represents the expected outcome for older students who look like the average student across the other variables (in this example, gender). In other words, the adjusted percentage who attained after controlling for age and gender is 32.5 percent (0.325 x 100 for conversion to a percentage).

It is relatively straightforward to produce a multivariate model using the DAS, since one of the DAS output options is a correlation matrix, computed using pair-wise missing values.[32] This matrix can be used by most statistical software packages as the input data for least-squares regression. That is the approach used for this report, with an additional adjustment to incorporate the complex sample design into the statistical significance tests of the parameter estimates (described below). For tabular presentation, parameter estimates and standard errors were multiplied by 100 to match the scale used for reporting unadjusted and adjusted percentages.

Most statistical software packages assume simple random sampling when computing standard errors of parameter estimates. Because of the complex sampling design used for the BPS and B&B surveys, this assumption is incorrect. A better approximation of their standard errors is to multiply each standard error by the design effect associated with the independent variable (DEFT),[33] where the DEFT is the ratio of the true standard error to the standard error computed under the assumption of simple random sampling. It is calculated by the DAS and produced with the correlation matrix.

[32]Although the DAS simplifies the process of making regression models, it also limits the range of models. Analysts who wish to use other than pairwise treatment of missing values or to estimate probit/logit models (which are the most appropriate for models with categorical dependent variables) can apply for a restricted data license from NCES. See John H. Aldrich and Forrest D. Nelson, 1984, *Linear Probability, Logit and Probit Models* (Quantitative Applications in Social Sciences, Vol. 45) Beverly Hills, CA: Sage.

[33]The adjustment procedure and its limitations are described in C.J. Skinner, D. Holt, and T.M.F. Smith, eds., *Analysis of Complex Surveys* (New York: John Wiley & Sons, 1989).

ISBN 0-16-049614-4

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